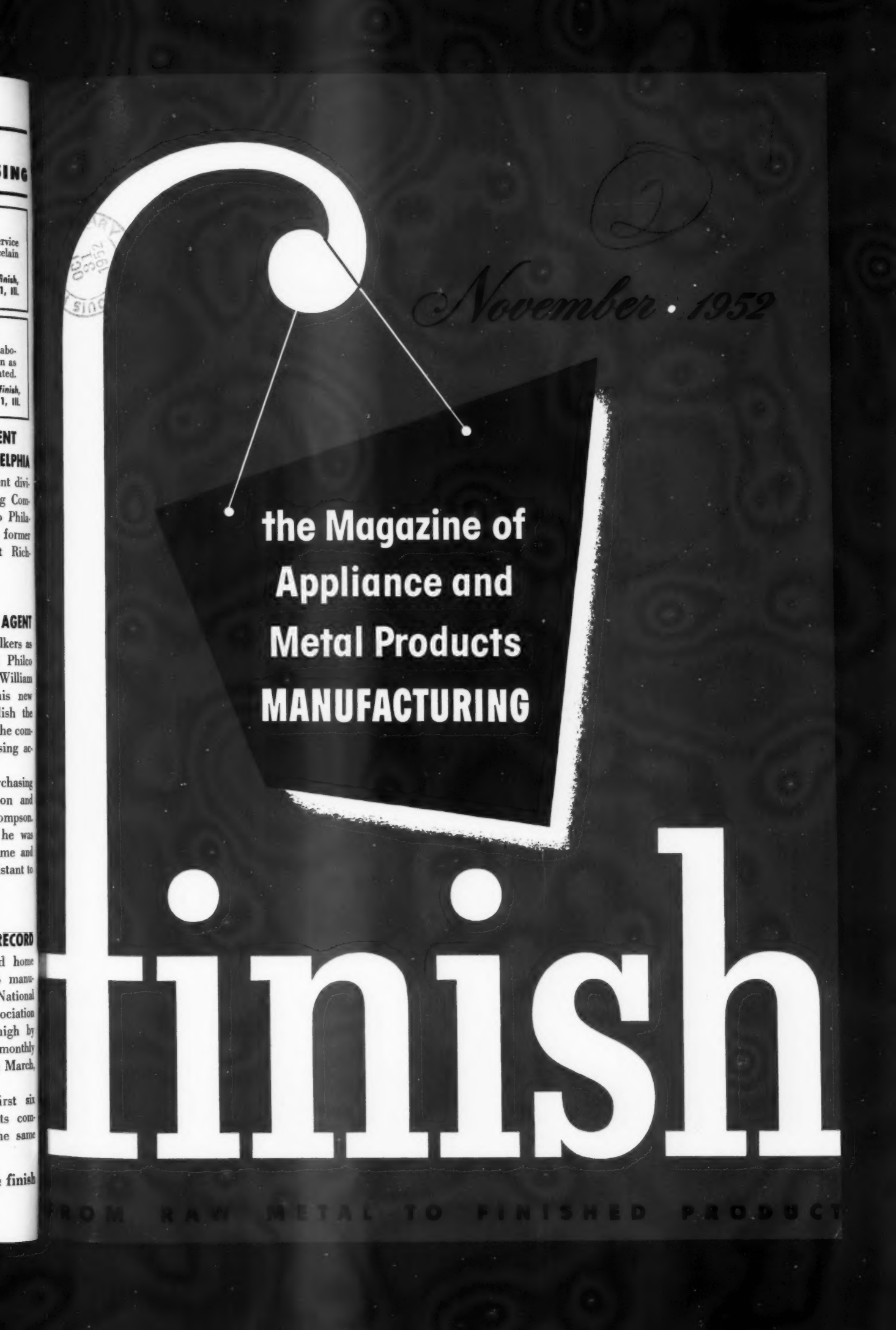

November · 1952
the Magazine of
Appliance and
Metal Products
MANUFACTURING
finish
FROM RAW METAL TO FINISHED PRODUCT

LIGHT ON DARK SCREENING COLORS

"Ceramic" HAS THEM!

When you have a job on which economical production calls for light screening colors on a dark background, come to "Ceramic." We have specialized in the development of dependable opaque light colors, and have solved problems for other enamelers. Let us work with you.

And, of course, "Ceramic" is prepared to supply your other enameling needs: a full range of screening colors, oils for various applications and conditions, and color oxides from delicate pastels to the most vivid hues.

CERAMIC COLOR & CHEMICAL MFG. CO.
New Brighton, Pa., U.S.A.

ADS OUT

CALORIC STOVE CORPORATION, Topton, Pa...

"Cooks up 45% Savings"

...by designing Tinnerman SPEED CLIPS into the New *Caloric* Ultramatic Gas Range!

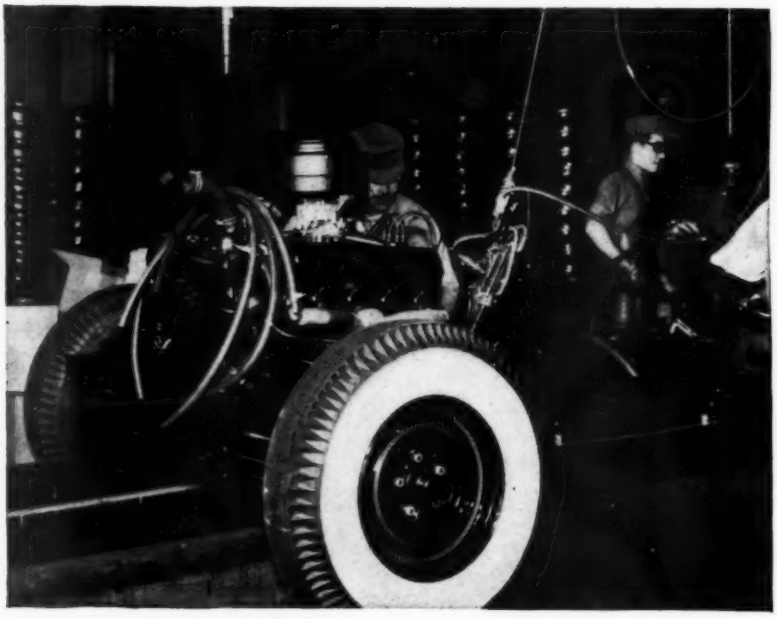
Engineers at Caloric Stove found a 45% savings in materials and production time by switching to TINNERMAN SPEED CLIPS for better, faster attachments on the new Caloric "Ultramatic"! Former methods for fastening the manifold and backguard molding required 60 parts, including bolts, nuts, and lockwashers. Now... 10 TINNERMAN SPEED CLIPS do the complete attachment job... a tremendous saving in parts and materials handling, plus an amazing gain in production man-hours. Caloric's cost analysis revealed a big 45% SPEED CLIP assembly savings!

Think of this production savings in terms of your own fastening problems. No matter what you assemble or build, it will pay you to turn to TINNERMAN for the answer to better fastening engineering methods... greater production savings! Whether it's a product in the design stages, or an established production item... the SPEED NUT principle of spring tension fastening will help cut costs for you! See the TINNERMAN representative in your area for details on the FREE TINNERMAN Fastening Analysis Service. Or write direct to: TINNERMAN PRODUCTS, INC., Dept. 12, Box 6688, Cleveland 1, Ohio. In Canada: Dominion Fasteners Ltd., Hamilton. In Great Britain: Simmonds Aerocessories, Ltd., Treforest, Wales. In France: Aerocessoires Simmonds, S. A.— 7 rue Henri Barbusse, Levallois (Seine) France.

The SPEED CLIP Way... Former fastening method for manifold and backguard molding required 20 bolts, 20 nuts and 20 lockwashers! On new models, the entire job is done with just 10 SPEED CLIPS which snap into place. They do a better job, faster, and reduce materials handling.
TINNERMAN Speed Nuts®
*Trade Mark Reg. U.S. Pat. Off.
FASTEST THING IN FASTENINGS®

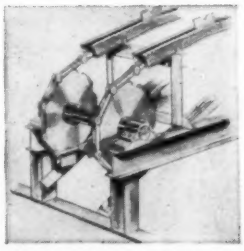
Tailor-Made Conveyor Systems

Increase Your Productivity While Lowering Costs With Webb Conveyors . . . Engineered To Meet Every Conceivable Mechanized Conveying Need.



Chassis Assembly Conveyor with continuous high tee-bars.

Typical of the versatility of Webb Conveying Systems are the chassis assembly conveyors in operation at one of the largest and most mechanized automobile plants in Detroit. For 25 years Webb has materially aided this manufacturer in maintaining production schedules and cost controls with installations such as these chassis assembly conveyors, which permit uninterrupted assembly to the chassis of rear axles, wheels, motor, gas tank and transmission.



Head End Section of Chassis Assembly Conveyor (notched tee-bar type).

Put to better use your Overhead, Floor or Underfloor Space . . . Let Webb Engineers Solve the Challenges Presented by your Most Complicated Materials Handling Problems.

CONVEYOR ENGINEERS AND MANUFACTURERS

JERVIS B. WEBB COMPANY

8913 ALPINE AVE.
DETROIT 4, MICH.

OFFICES IN PRINCIPAL CITIES

FACTORIES IN DETROIT . . . LOS ANGELES . . . HAMILTON, ONT.

MEETINGS

HOME LAUNDRY CONFERENCE

The 6th National Home Laundry Conference, Hotel Commodore, New York City, October 30-31.

ENAMELERS CLUBS

Central District Enamelers Club, tour of Frigidaire plant, Moraine City, Ohio, November 7.

Eastern Enamelers Club, Philadelphia, Pa., November 8.

PAINT INDUSTRY MEETINGS

National Paint, Varnish & Lacquer Association, annual meeting, Palmer House, Chicago, November 17-19.

Federation of Paint and Varnish Production Clubs, Palmer House, Chicago, November 20-22.

ELECTRICAL MFRS. ASSN.

National Electrical Manufacturers Association, annual meeting, Atlantic City, N. J., November 10-13.

COOKING, HEATING INSTITUTE

Institute of Cooking and Heating Appliance Manufacturers, winter meeting, Cincinnati, December 1-2.

STEEL KITCHEN ASSN.

Steel Kitchen Cabinet Manufacturers Association, annual meeting, Cleveland, December 3.

HOME LAUNDRY MFRS. ASSN.

American Home Laundry Manufacturers Association, annual meeting, Chicago, January 3.

HOMEFURNISHINGS MARKET

International Winter Homefurnishings Market, Chicago, January 5-16.

HEATING, VENTILATING SHOW

International Heating and Ventilating Exposition, Chicago, January 26-30, in conjunction with annual meeting of American Society of Heating and Ventilating Engineers.

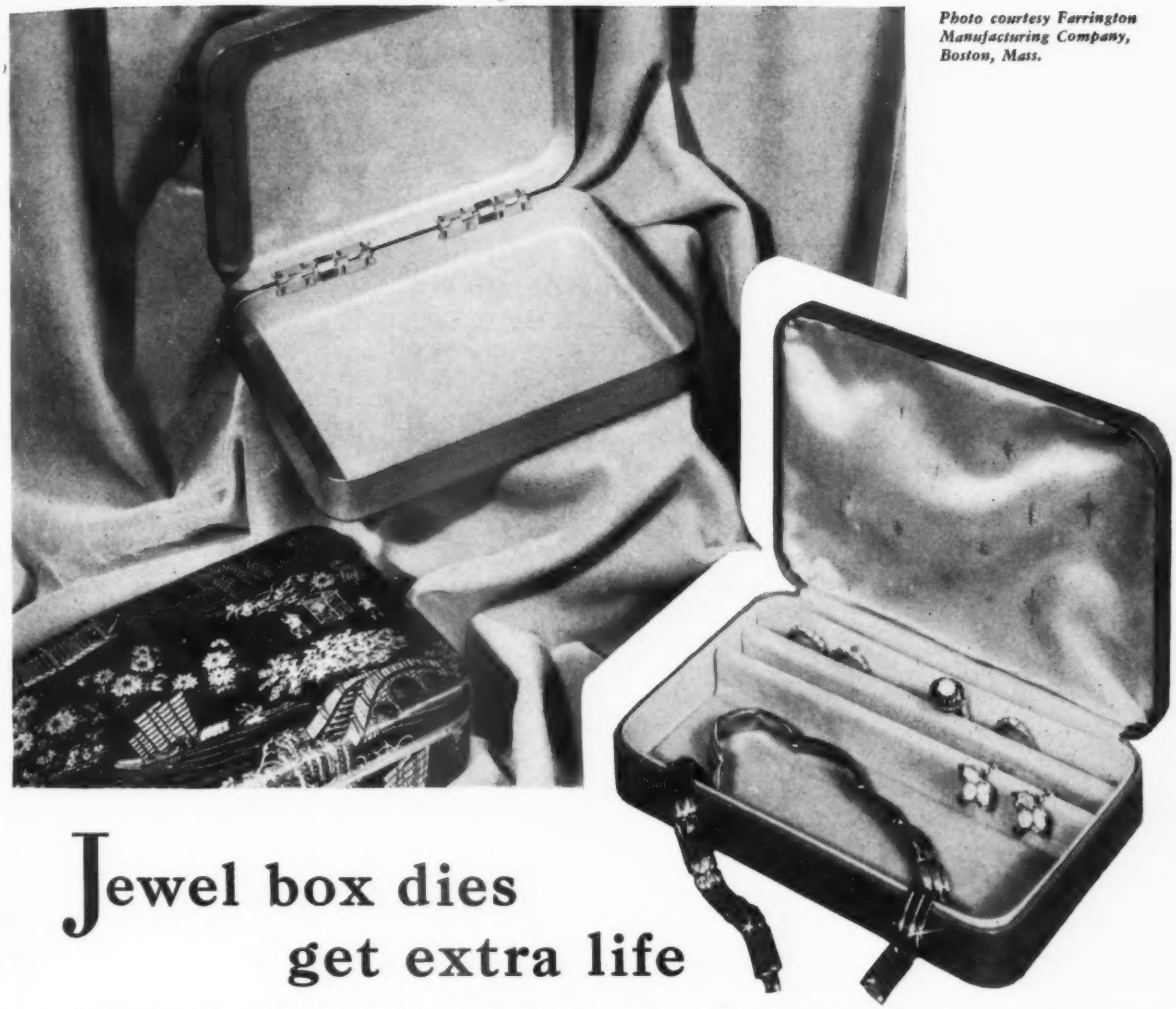


Photo courtesy Farrington Manufacturing Company, Boston, Mass.

Jewel box dies get extra life

"Fabulous Beauty by Farrington," is the slogan used by Farrington Manufacturing Company, Boston, to describe fabric- and leatherette-covered jewel and cigarette boxes and product packages.

Shells for many higher-quality Farrington boxes are stamped from Republic Electro Paintlok and Electro Zincbond. These zinc-coated, chemically-treated steel sheets originally were developed to *take* and *hold* paints, lacquers, and synthetic enamels. They do that job well.

And, Farrington Manufacturing Company finds that they offer four more distinct advantages in the production of fabric-covered and lined boxes:

1. ***Extra die life***—up to four times the production between grinds—because their tight zinc coating acts as an effective die lubricant.
2. ***Protect exterior beauty:*** the zinc coating retards rusting action which would "blister" brocade and leatherette coverings.
3. ***Protect satin linings*** against interior rust stains.
4. ***Offer improved adhesion*** for the latex which binds coverings to shell.

Republic Electro Paintlok and Electro Zincbond offer other worthwhile advantages to all manufacturers of painted or enameled steel products. Their full story is colorfully detailed in Republic Booklet 525. Write for your *free* copy today. Address:

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

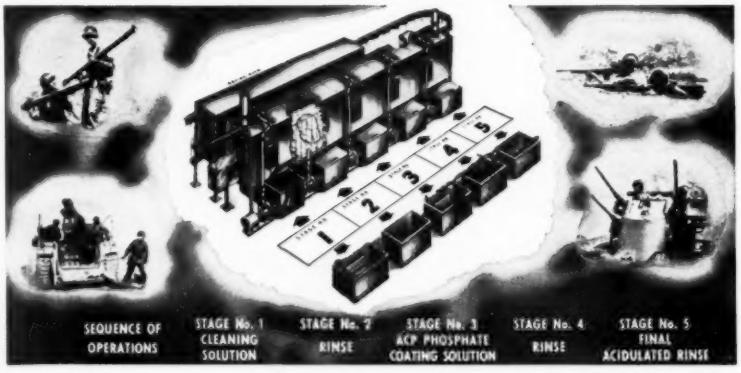
Republic
REPUBLIC STEEL
ELECTRO ZINC PLATED SHEETS
Electro Paintlok · Electro Zincbond

Other Republic Products include Carbon, Alloy and Stainless Steels—Sheets, Strip, Plates, Bars, Pipe, Tubing, Bolts and Nuts, Wire

AMERICAN CHEMICAL PAINT COMPANY

AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet
Subject: METAL PRESERVATION AND PAINT PROTECTION WITH ACP PHOSPHATE COATING CHEMICALS


SEQUENCE OF OPERATIONS
STAGE No. 1 CLEANING SOLUTION
STAGE No. 2 RINSE
STAGE No. 3 ACP PHOSPHATE COATING SOLUTION
STAGE No. 4 RINSE
STAGE No. 5 FINAL ACIDULATED RINSE

U.S. ARMY PHOTOGRAPHS COURTESY OF "ORDNANCE MAGAZINE"

Typical spray and dip phosphating equipment and some ordnance products that are now given a protective phosphate coating for extra durability under all kinds of severe exposure conditions. Both military and civilian applications of ACP phosphate coating chemicals are shown in the chart below.

SELECTION CHART OF ACP PROTECTIVE COATING CHEMICALS FOR STEEL, ZINC, AND ALUMINUM

METAL	ACP CHEMICAL	OBJECT OF COATING	TYPICAL METAL PRODUCTS TREATED	GOVERNMENT SPECIFICATIONS
STEEL	"GRANODINE" Zinc Phosphate Coating Chemical	Improved paint adhesion	Steel, iron, or zinc fabricated units or components, automobile bodies, refrigerators, washing machines, cabinets, etc.; projectiles, rockets, bombs, rifles, small arms, belt links, cartridge tanks, vehicular sheet metal, tank bolts and links, recoilless guns, etc.	MIL-S-5002 JAN-C-490, Grade 1 JAN-F-495 U.S.A. 57-0-2, Type II, Class C U.S.A. 51-70-1, Finish 22.02, Class C U.S.A. 50-60-1 16 E4 (Ships)
	"PERMADINE" Zinc Phosphate Coating Chemical	Rust and corrosion prevention	Nuts, bolts, screws, hardware items, tools, guns, cartridge clips, fire control instruments, metallic belt links, steel aircraft parts, certain steel projectiles and many other components.	MIL-C-16232 U.S.A. 57-0-2, Type II, Class B U.S.A. 51-70-1, Finish 22.02, Class B Navy Aeronautical M-364 U.S.A. 72-53 (See An-F-20)
	"THERMOIL-GRANODINE" Manganese-iron Phosphate Coating	Wear-resistance anti-galling, safe break-in of friction or rubbing parts. Rust proofing.	Friction surfaces such as pistons, piston rings, gears, cylinder liners, camshafts, tappets, crankshafts, rocker arms, etc. Small arms, weapon components. Hardware items, etc.	MIL-C-16232 U.S.A. 57-0-2, Type II, Class A U.S.A. 51-70-1, Finish 22.02 Class A Navy Aeronautical M-364 U.S.A. 72-53 (See AN-F-20)
	"GRANODRAW" Zinc-iron Phosphate Coating	Improved drawing, extrusion, and cold forming	Blanks and shells for cold forming, heavy stampings; tubs; tubing for forming or drawing; wire; rod; etc.	———
ALUMINUM	"ALODINE" Protective Coating	Improved paint adhesion and corrosion resistance	Aluminum products of similar design such as refrigerator parts, wall tile, signs, washing machine tubs, etc; aircraft and aircraft parts; bazookas (rocket launchers), helmets, belt buckles, clothes dryers, clothesline, rocket motors, etc., aluminum strip or sheet stock.	MIL-C-5541 (See also QPL-5541-1) MIL-S-5002 AN-F-20 U.S. Navord O.S. 675 16 E4 (Ships) AN-C-170 (See MIL-C-5541) U.S.A. 72-53 (See AN-F-20)
ZINC	"LITHOFORM" Zinc Phosphate Coating Chemical	Improved paint adhesion	Zinc alloy die castings; zinc or cadmium plated sheet or components; hot dip galvanized stock; galvanneal; signs; siding; roofing; galvanized truck bodies; etc.	QQ-P-416 RR-C-82 JAN-F-495 AN-F-20 U.S.N. Appendix 6 U.S.A. 72-53 (See AN-F-20)

CHEMICALS ACP PROCESSES

WRITE FOR DESCRIPTIVE FOLDERS ON THE ABOVE CHEMICALS AND FOR INFORMATION ON YOUR OWN METAL PROTECTION PROBLEMS

CHEMICALS ACP PROCESSES

excellent section on AHLMA and home laundry industry

Gentlemen:

As president of the American Home Laundry Manufacturers' Association, I am sending this letter as a note of appreciation for the very excellent section in September *finish* covering the home laundry industry and the current activities of AHLMA.

Inasmuch as this is the sixth of such special sections that have appeared in *finish*, I feel certain that you have had earlier notes of appreciation from the presidents during preceding years, but I wanted to add my expression to what you may have received earlier.

We all appreciate the good work of the *trade publications* reaching distributors and dealers, but as the "*appliance publication*" at the manufacturers' level, *finish* is doing a remarkable job of assisting the cooperative organizations such as AHLMA, and your close cooperation and thorough editorial coverage of the industry and Association activities is of inestimable help to organizations such as ours.

Fred M. Mitchell, President
American Home Laundry
Manufacturers Association

most interesting

Gentlemen:

I always find it most interesting to read the contents of this fine publication presented in such an interesting way . . .

Hjalmar Olson
Aktiebolaget Gustavsbergs Fabriker
Gustavsberg, Sweden

excellent coverage of AES metal finishing expsition

Gentlemen:

At the last meeting of the Executive Board of the American Electroplaters' Society, the excellent coverage of the Metal Finishing Exposition and the Chicago Convention of the Society by *finish* was commented upon and the writer was instructed to tender the appreciation of the Board and the Society to you for your heartening cooperation in helping to make both a success. Such efforts as these make it easier for us to better serve the metal finishing industry.

D. Gardner Foulke
Executive Secretary
American Electroplaters' Society

finish SUGGESTION BOX

Air-inflated grinders cut polishing time 50%

POLISHING stainless steel down to a number four finish is a daily problem at Claus Mfg. Co., Cleveland, Ohio. As part of their cost-reduction program, Claus switched to air-inflated grinders. Now this finishing operation is done in half the previous time.

"Our deep drawn stainless steel sink bowls come in a 2B finish. These are welded in stainless steel sink tops that have a standard number four mill finish. Finishing the bowls to match the tops was a very difficult operation when we used hard-wheel grinders. The inherent chatter and bounce of this type grinder always produced a herringbone pattern finish. Now that we're using air-inflated grinders, we get a smooth finish every time. And, the same crew of men turn out about twice as much work," says Frank Greuling, plant manager.

Air-inflated grinders are used for grinding welds and polishing stainless steel at Claus Mfg. plant. Production is reported to have doubled.

Claus uses two sizes of air-inflated grinders — one is 5″ diameter by 3½″ wide; the other is 3¼″ diameter by 3″ wide. Both consist of a rubber drum mounted on a core assembly. The operator slips an abrasive band over the drum and then inflates the drum with from 3 to 10 pounds of air. The grinders can be used with any kind of power tool for any type of grinding or finishing job.

The resiliency of this type of grinder permits far greater abrasive contact area, eliminates chatter and bounce, enables the grinder to polish contours more efficiently and is 100% safe. Users claim abrasive belt life is more than doubled.

Source for further information on air-inflated grinders may be obtained by writing *finish*.

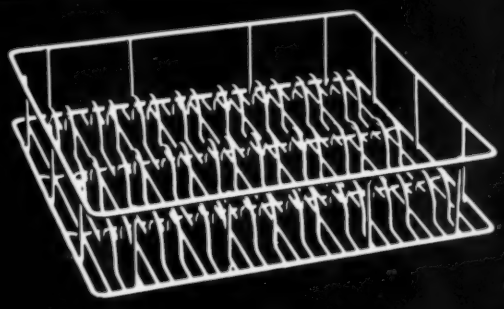
OIL-FIRED CENTRAL HEATING PLANTS IN 6,100,000 HOMES

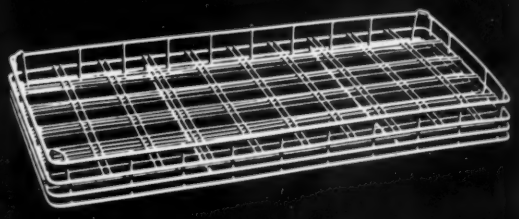
An estimated total of 13,000,000 homes in the United States are heating with oil, reports the Plumbing and Heating Industries Bureau. This total includes 6,100,000 homes heated with oil-fired central heating plants. In addition, there are over 500,000 commercial-industrial burners in use.

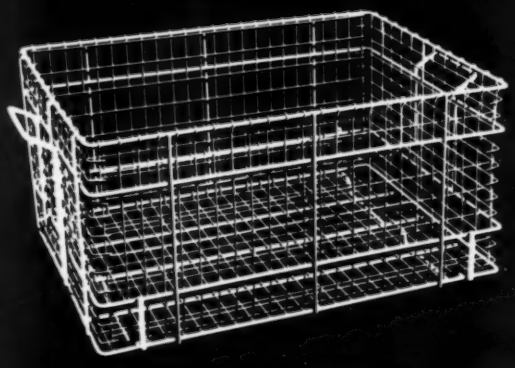
GAS RANGE MFRS. EXPECT SALES TO EQUAL 1951

A marked rise in gas range shipments during the normally slack months of June, July and August indicate a trend, range manufacturers believe, which will continue through the fourth quarter to result in this year's sales equalling or surpassing the 1951 total of 2,356,000.

HELP for tight schedules



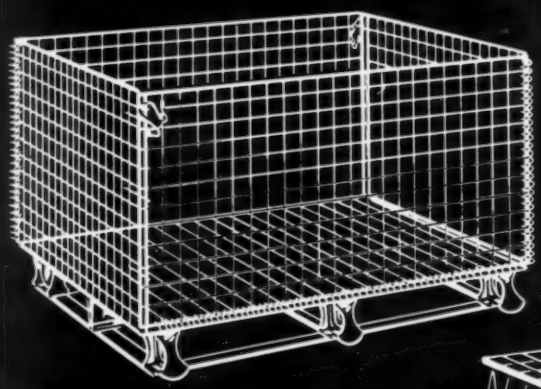


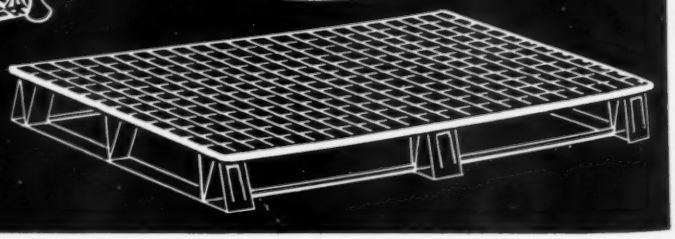


Union Steel
MATERIALS HANDLING
BASKETS, PALLETS, PALLETAINERS

Faced with difficult production schedules? These versatile Union Steel welded wire material handling developments are speeding . . . and easing . . . countless washing, dipping, degreasing, handling, assembling, storing and shipping operations in hundreds of plants.

- USP Materials Handling Baskets, smooth, sturdy, economical, are readily available in a broad range of sizes, types, materials and protective finishes. Also designed and built to your specifications for efficient handling of projectiles, shell cases, fuses, etc.
- USP Palletainers for shipment, storage, production line use or in plant transport, are economical, practically indestructible. Provide safest protection for heavy pieces or light fragile loads . . . prevent breakage, pilfering or shipping damage . . . give peak utilization of vertical storage space with full visibility.
- USP Pallets make palletizing of tires, drums, kegs and other bulky objects easy. Stacking and easy maneuverability features speed handling, save floor space, simplify inventory.





• For expert cooperation in speeding production schedules through more efficient material handling, write, wire or 'phone for a USP Engineer now.

A SYMBOL OF QUALITY

USP

UNION STEEL PRODUCTS CO.

Materials Handling Equipment Div. • ALBION, MICH.

Three-phase, frequency-converter welding machine used to fabricate world's largest external fuel tanks for aircraft.

Problems and equipment in spot welding

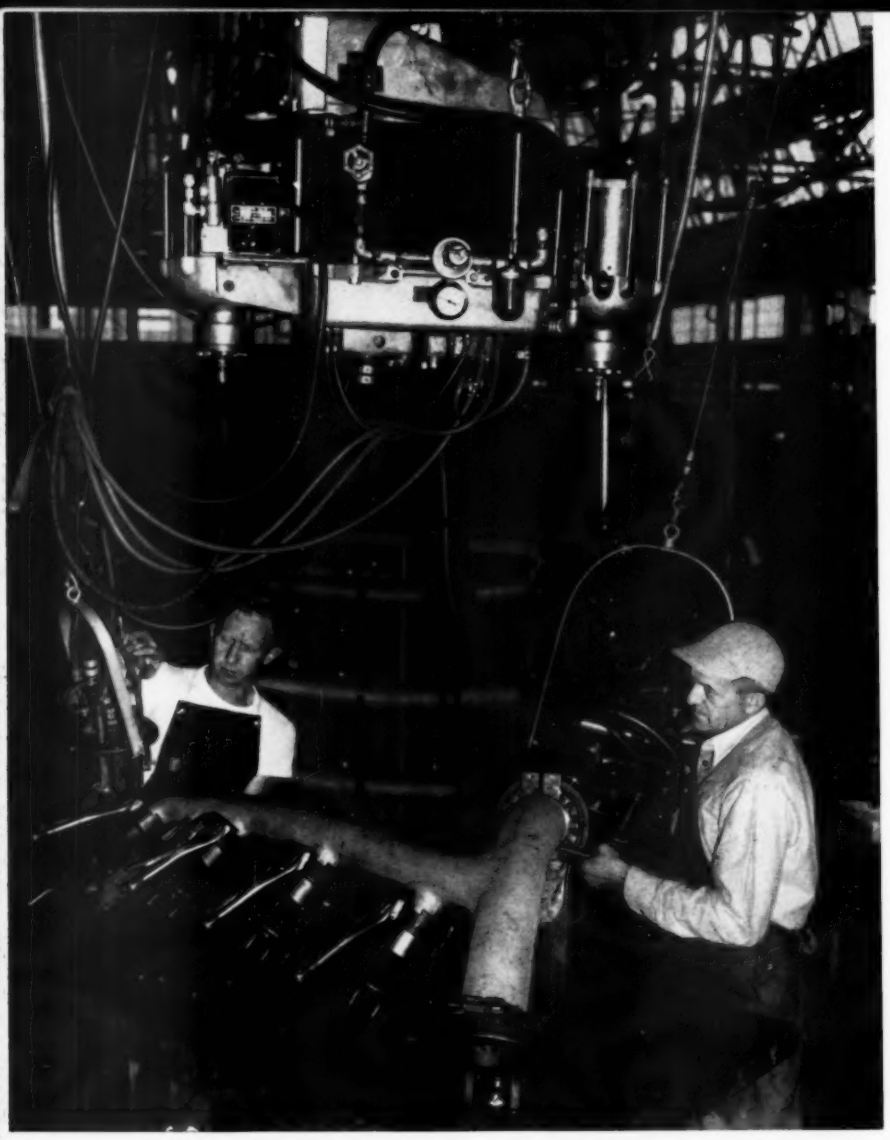
an article on aircraft welding offering information of importance for engineers and production men throughout the metal products manufacturing field

by J. R. Fullerton • DEVELOPMENT LABORATORIES, RYAN AERONAUTICAL CO., SAN DIEGO, CALIF.

DEFENSE PRODUCTION FEATURE

Resistance welding has enjoyed a swift rise to an important position in the aircraft industry within the past few years. Previously considered suitable only for joining secondary components because of its lack of capacity and uniformity, resistance welding is now being used extensively in the fabrication of all types of primary load-carrying structures. Reasons for this swift development are the greatly improved performance of modern equipment and the extensive backlog of experience which manufacturers have accumulated.

The advantages of resistance welding are tailored to fit aviation's needs. It is the fastest, cleanest method for joining weldable metals, and, what is extremely important, adds no weight to many standard designs. A headless, invisible nugget of fused metal replaces the common rivet. It leaves aircraft surfaces smooth and clean with no protuberances to interfere



Twin "gun" spot welding machine suspended from overhead conveyor. This is a single-phase type used to obtain good spot welds in this aircraft exhaust system where access to the flanges is a factor.

with aerodynamic efficiency.

73 welding machines in 4 group classifications

The Ryan plant contains 73 resistance welding machines, including some of the largest and most modern facilities of their type. These consist of four main groups: (1) three-phase, frequency-converter spot, roll-spot, and seam welders; (2) three-phase, electrostatic, stored-energy spot and roll-spot machines; (3) three-phase, dry-disc, rectifier spot and seam welders; and (4) single-phase, alternating current spot, seam, and spot-tack machines.

Unlike many commercial manufacturers, who use spot welding for a limited number of materials and fairly standard applications, Ryan employs this technique for a wide variety of metals and designs. In addition to the aluminum and magnesium alloys commonly used in aircraft work, our fabrication includes the various stainless steels, such as types 347, 321, 302, 310, 410, and 19-9DL, the mild steels, and the metals of titanium, Inconel, Inconel X, Rosslyn Metal, Haynes-Stellite-N-155, and 17-14 CuMo.

These materials are employed both in airframe applications where strength and light weight are paramount considerations, and in jet, rocket, and piston engine components where resistance to heat and corrosion at high temperatures is a vital requirement. Most of these applications place important responsibilities upon resistance welding because structural failure can result in loss of life.

With such variety of materials, gauges, and designs, resistance welding facilities must be comprehensive and versatile. Each product presents a specialized problem to be analyzed in terms of equipment, joint efficiency, economy and service life. Ryan facilities are capable of performing every task within the industry's scope from the simple tack-welding of stainless steel exhaust manifolds to the production of the world's largest external fuel tanks for aircraft.

Resistance welding machines have limitations both as to capacity and flexibility. Therefore, one of the most important considerations of a successful program of resistance welding is the selection of the equipment. Careful balance must be maintained between the types of machines used. Facilities have become so specialized, that it is mandatory that each machine be purchased with specific types of materials, gauges, and designs in mind, providing for versatility as far as possible. Provisions for new, future developments should be made by selecting equipment which lends itself to improvement and expanded utilization. The above is not intended to advocate purchase of new equipment for each new job, but to emphasize the point that all new equipment should be adaptable to future anticipated work wherever possible.

Our manufacturing operations are concerned with two general classes of metals of quite different characteristics—heat and corrosion resistant alloys and the light aloys. During World War II, extensive fabrication of secondary aluminum structures was accomplished by use of stored-energy type machines. Successful structural welding of heavy-gauge aluminum alloys was not performed in aircraft until more modern welding machines, capable of delivering higher currents and exerting heavier forging pressures, were designed. Today, "crack-free" structural welds are not only practical but common. This is due not only to improvement

in controls but also to development of larger machines, improved pressure systems, and improved welding techniques and process controls.

In the case of the stainless steels, resistance welding of structural components was accomplished early, but the scope of this process has expanded with the growth of the jet engine program. The stainless steels lend themselves well to resistance welding techniques. Many of the alloys are heat-treatable. This necessitates special pre-and post-heating accessories or the use of heat-treating furnaces to temper the weld area to avoid cracking after welding.

With these alloys, we encounter narrower edge distances and overlaps due to the weight requirements of aeronautical components. Another problem is the expanding use of mixed alloys in a structure so that different melting points and electrical resistances may exist between continuous sheets, thus presenting heat balance problems.

Three-phase frequency-converter machines

Included in our group of three-phase, direct demand machines are some of the largest of this type. These were selected for both production use and developmental purposes. Every accessory purchased with them was intended to fit them for all types of work with steel and aluminum alloys and for use in experimental investigations. Our large machines are rated at 120,000 amperes short circuit current and 11,000 pounds electrode force. This potent power can perform continuous, crack-free structural welds in two sheets of .187 inch steel or .125 inch aluminum, to exacting military specifications.

These machines have excellent versatility. We use them for production of welding of such varied materials as titanium, the nickel alloys, stainless steels, and mild steels. All resistance welding of aluminum alloys is now confined to either these machines or our three-phase, electrostatic, stored-energy type machine.

It is fair to say that the development of the electronic controls has made modern resistance welding successful, and nowhere is this better exemplified than in the complex electronic controls of this equipment. We have precision control over waveshape, time, and pressure cycles in these machines. . .

We feel that the three most important problems requiring concern in utilizing these machines are maintenance, electrode life and pick-up, and sensitivity to power variation. The maintenance problem is a natural outgrowth of the increase in number and complexity of circuitry. We find that our concern for this problem is lessening as our maintenance personnel become more familiar with the equipment and its functions. However, the machines demand a higher calibre of maintenance personnel and greater diligence to the understanding of the work.

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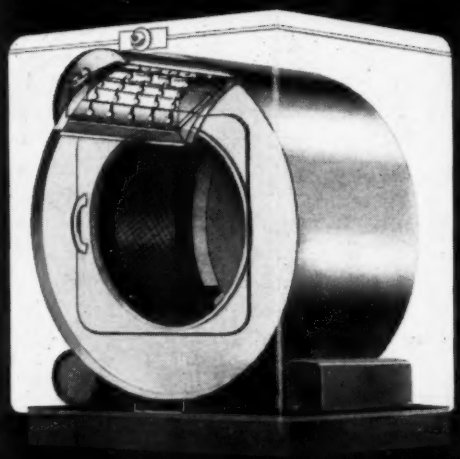
Bank of single-phase spot welding machines used at Ryan to "spot tack" stainless steel half-stampings into alignment prior to seam welding operations.

Could the answer to your problem be

OPEN COIL HEATING ELEMENTS?



LIKE THIS CLOTHES DRYER UNIT?

OR THIS ROASTER UNIT?

Could be! We make them for everything from electric range ovens to space heaters to cattle dehorners.

Where do you need heat? What kind of temperatures are required? What type of terminals? How much space is available? If the application is one where you can use open coil units, chances are you can save money.

Ferro engineers will welcome an opportunity to help you explore all the angles. Our men are experts on heat patterns, heat losses and good heating design; can counsel you on wattages, controls and mountings.

Ferro units are long-lived and dependable. Only highest grade nichrome resistance wire, steatite insulators, cold-rolled steel go into them. And—thanks to Ferro's exclusive "floating" construction, Ferro units can expand and contract over thousands of heating cycles without distortion.

So if you have a heating problem, be sure to consider Ferro units. We can save you time, trouble and money . . . can guide you around pitfalls . . . can help you improve your product.

For complete information on heating elements, controls and other Ferro products, write for this free catalog—today!

FERRO

FERRO ELECTRIC PRODUCTS, INC.

A Subsidiary of Ferro Corporation

KIRKLAND, ILLINOIS

Cold facts about Hotpoint

refrigerator laboratory at Hotpoint Company makes use of instrument-controlled test chambers to check product design and performance

by E. A. Murphy • *MINNEAPOLIS-HONEYWELL REGULATOR CO., PHILADELPHIA; BASED ON AN INTERVIEW WITH HOTPOINT ENGINEERS*

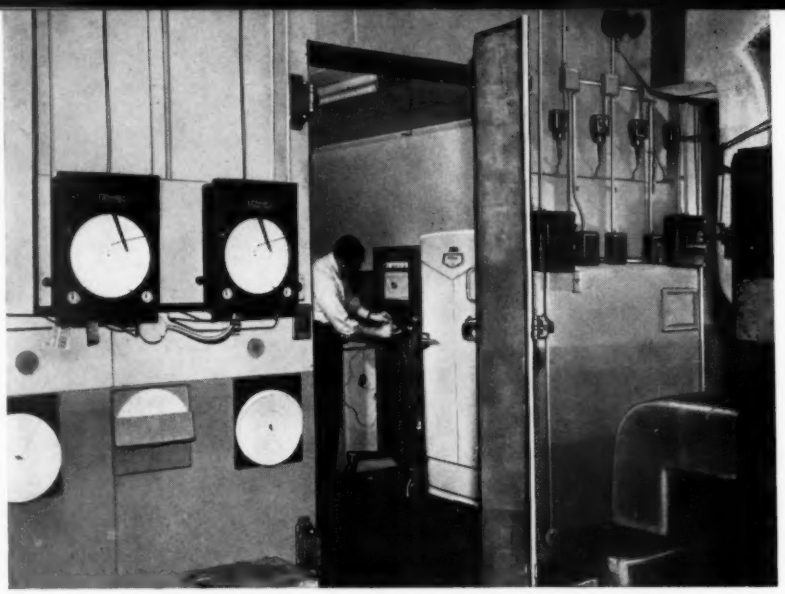
THE personnel at the refrigerator laboratory of Hotpoint Company, Chicago, Ill., are charged with the responsibility of making sure that Hotpoint refrigerators and home freezers are equally at home in desert or tropical climate. Using scientifically designed test rooms, and accurate measuring and controlling equipment, they put the refrigerators through grueling tests—subject them to conditions far more severe than are likely to be encountered in the kitchen of even the most thoughtless refrigerator user. These tests point out any weakness in original design, and enable the designer to correct the situation before any units of a certain model roll off the production line and into the homes.

Humidity test room for "sweat-free" operation

To guard against sweating, either internal or external, the refrigeration laboratory utilizes carefully controlled humidity test rooms where refrigerators are tested at a room temperature of 100° F, and at several humidities running well up toward the 100 per cent mark.

Both temperature and humidity within each test room are continuously and automatically controlled by means of a two-pen recording wet and dry bulb thermometer that operates in conjunction with a number of pneumatic-electric relays. The dry bulb pen, through its pneumatic control unit, transmits to the pneumatic-electric relays an air pressure that varies in proportion to the deviation of the pen from its set point. Should the pen deviate further from the set point, the transmitted air pressure continues to change. Each pneumatic-electric relay is adjusted to close an electrical contact at some specific air pressure, and this contact actuates an electric strip heater in the air conditioned duct to the test chamber. Thus, a small drop in test room dry bulb temperature causes one heater to go on. If the one heater is inadequate to restore the temperature to the pre-set value, the instrument air pressure continues to build up, and a second pneumatic-electric relay actuates another heater. This action continues until sufficient heaters are in operation to bring the test room up to the desired temperature.

Although this method of control is functioning quite satisfactorily, plans for a future test room call for the use of special air-operated units which will replace the pneumatic-electric relays now in use. The purpose is to enable the dry bulb control unit to exercise even closer control by actually proportioning the amount of current supplied to the heaters as contrasted to the present step-wise in-



One of several temperature test rooms. One of two recording thermometers shown controls test room temperature.

crease or decrease in heat input.

The wet bulb control unit regulates the moisture content of the test chamber air by controlling the temperature of water in the air washer.

Engineer outside checks what's going on inside

The refrigerators to be tested are placed in the humidity room, and, before the temperature and humidity of the room are raised to "New Guinea jungle" conditions, are connected electrically to the instruments on the test panel, illustrated, which is located just outside the test room door. Thermocouples are placed within each refrigerator to measure the temperatures at different locations. Humidity inside the cabinet, as well as power consumed by the refrigerator drive motor, and frequency and duration of motor operation are also measured.

With the exception of periodic inspections to determine whether external sweating is taking place on the models under test, all observations during the test run are made at the test panel. Across the top of the panel are the watt-hour meters, one for each refrigerator under test. Immediately below each of these is a switch which turns on the test model and a signal light that shows that power is being supplied to the refrigerator. The panel shown has facilities for handling 10 separate refrigerators during a single test run. At the lower left of the panel is a cycle recorder that charts the frequency and length of operation of each refrigerator motor.

The single instrument in the center of the panel, immediately in front of the test engineer, is a precision indicator that provides rapid indication of the temperature at any point within any refrigerator in the test room. By means of the combination of key and rotary switches shown, the engineer can select measuring points and read their temperatures as fast as he can write them down.

From the information gathered from these tests, the cabinet design engineer is able to make a careful check on his design. He can tell what places need a little more insulation — whether a slight change in the method of attaching the inner liner to the outer cabinet shell is advisable — and other desirable design changes. This he determines by inspecting the marked "sweat" areas.

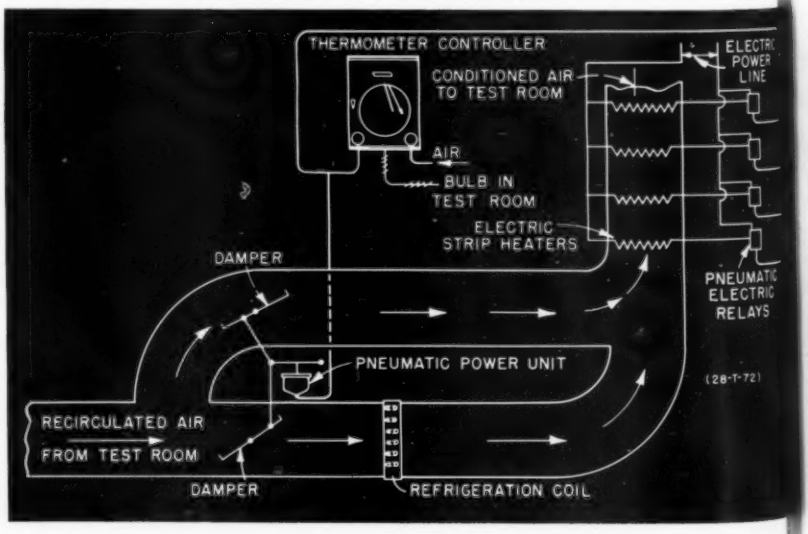
The unit engineer can tell, from the logged temperatures, whether milk would freeze, or whether it would take 30 minutes or four hours to produce a tray of ice cubes if the refrigerator user lived in a New Guinea jungle.

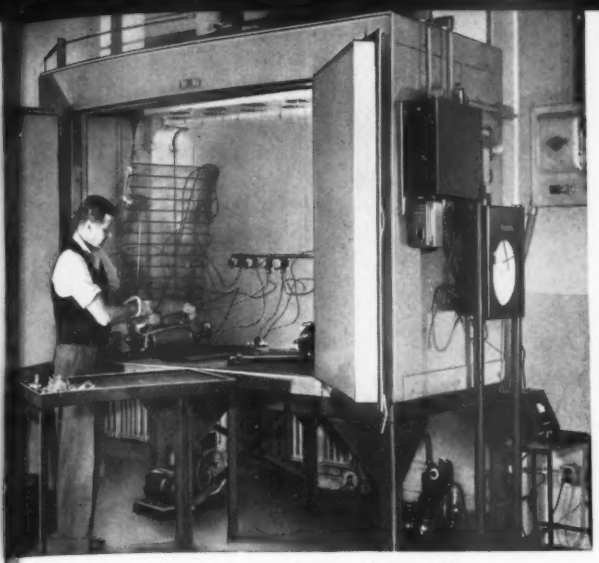
Testing under worst tropical conditions not enough

The tests just described give all the information necessary to determine just how a Hotpoint refrigerator will perform in the worst sort of tropical climate. Luckily, however, by far the greater proportion of refrigerator users live in places other than the New Guinea jungle, so the refrigerator laboratory is interested in accumulating data concerning the operation of its products under climatic conditions more frequently encountered throughout various sections of this country.

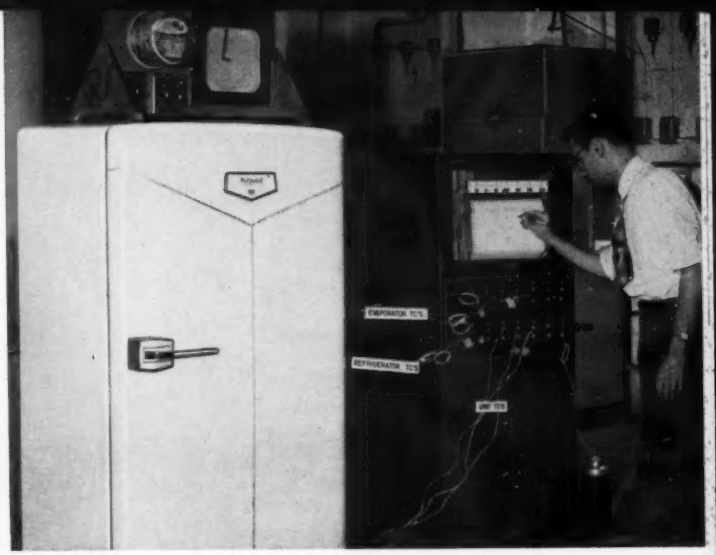
For this reason, performance tests are also run in a number of test rooms where temperature alone is the primary factor. These temperature test rooms, one of which is shown in the illustration, have provisions for running tests, during which time two or three different room temperatures will be employed. As in the case of the tests conducted in the humidity

Schematic drawing of control system for temperature test room.





Removing moisture from refrigerating units.



Refrigerator set up for typical temperature test.

room, information on internal cabinet and freezer temperatures and pressures, power consumption, running time, and frequency of operation is accumulated.

The method of controlling the test room temperature during these performance tests is shown in the accompanying schematic drawing. An air conditioning unit is located adjacent to each test room. Construction of this assembly permits all, some, or none of the recirculated room air to pass over the cooling coils. All of the air passes over the electrical strip heaters installed in the inlet air duct.

A recording thermometer controller, with its bulb located in the test room, transmits an air pressure both to a pneumatic power unit that operates the two by-pass dampers, and to a number of pneumatic-electric relays that supply power to the electric strip heaters.

Should the test room temperature rise *above* the value established by the control point setting of the recording thermometer, the pneumatic control unit within the instrument will turn off the power to the strip heaters, if on, and reposition both dampers so that more of recirculated air will pass over refrigeration coil.

Conversely, should this temperature continue to remain *below* the set point, even after the dampers are positioned to by-pass all of the air around the refrigeration coil, the instrument will, by means of the pneumatic-electric relays, actuate, in succession, the number of strip heaters required to return the temperature to the correct value. When it is necessary to change the temperature being maintained in the test room, the test engineer need only reset the set point index of the recording instrument to the new temperature. The control system will automatically establish and maintain the desired temperature within the room.

Recorder accompanies refrigerator into test room

In the temperature test rooms, conditions are such that it is not necessary to keep the measuring instruments outside the test chambers. Consequently, Hotpoint utilizes a potentiometer mounted on a special portable fixture. This instrument (shown in position in the test chamber in one illustration — and outside the chamber in another — to illustrate the manner in which the leads from the thermocouples are brought out to the recorder) is capable of continuously recording for a 30-day period temperatures measured at up to 16 different points.

The illustration of the test set-up made outside the test room shows complete equipment utilized in running a temperature test on one refrigerator or home freezer unit. Mounted atop the refrigerator are a watt-hour meter and a cycle recorder, along with necessary power switches. The recorder, on its portable fixture, continuously plots curves of temperatures sensed by thermocouples located as follows: (1) at several places on the evaporator; (2) at varying locations within the refrigerator storage space; and (3) at several places on the refrigerating unit.

With the exception of data pertaining to sweating under high humidity conditions, the information gathered during these tests is similar to that accumulated during the humidity chamber run. Power consumption, frequency and duration of motor operation, operating temperatures of various parts of the refrigerating unit, and temperatures at different points within the food storage space and freezing compartment, as well as on the evaporator proper, are all made available to the engineer.

Moisture has no place in refrigerating unit

A drop of moisture trapped inside the refrigerant circuit of a refrigerating unit can cause no end of trouble. For example, the moisture would freeze in one or more of the small passages, blocking flow of refrigerant—rendering unit inoperative.

For this reason, great care is taken to be absolutely sure that every drop of moisture is removed from the unit before it is charged with refrigerant. This is accomplished by placing the entire unit, as shown, in an electrically heated oven, and connecting it to a vacuum pump.

A recording thermometer with electric control raises the oven to a temperature of 275° F., and holds it there during the dehydrating cycle. At the same time, the vacuum pump reduces the pressure within the fluid circuit of the unit from atmospheric (approximately 760 millimeters of mercury) to below 135 microns (0.135 millimeter) of mercury.

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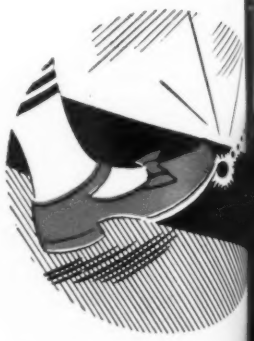

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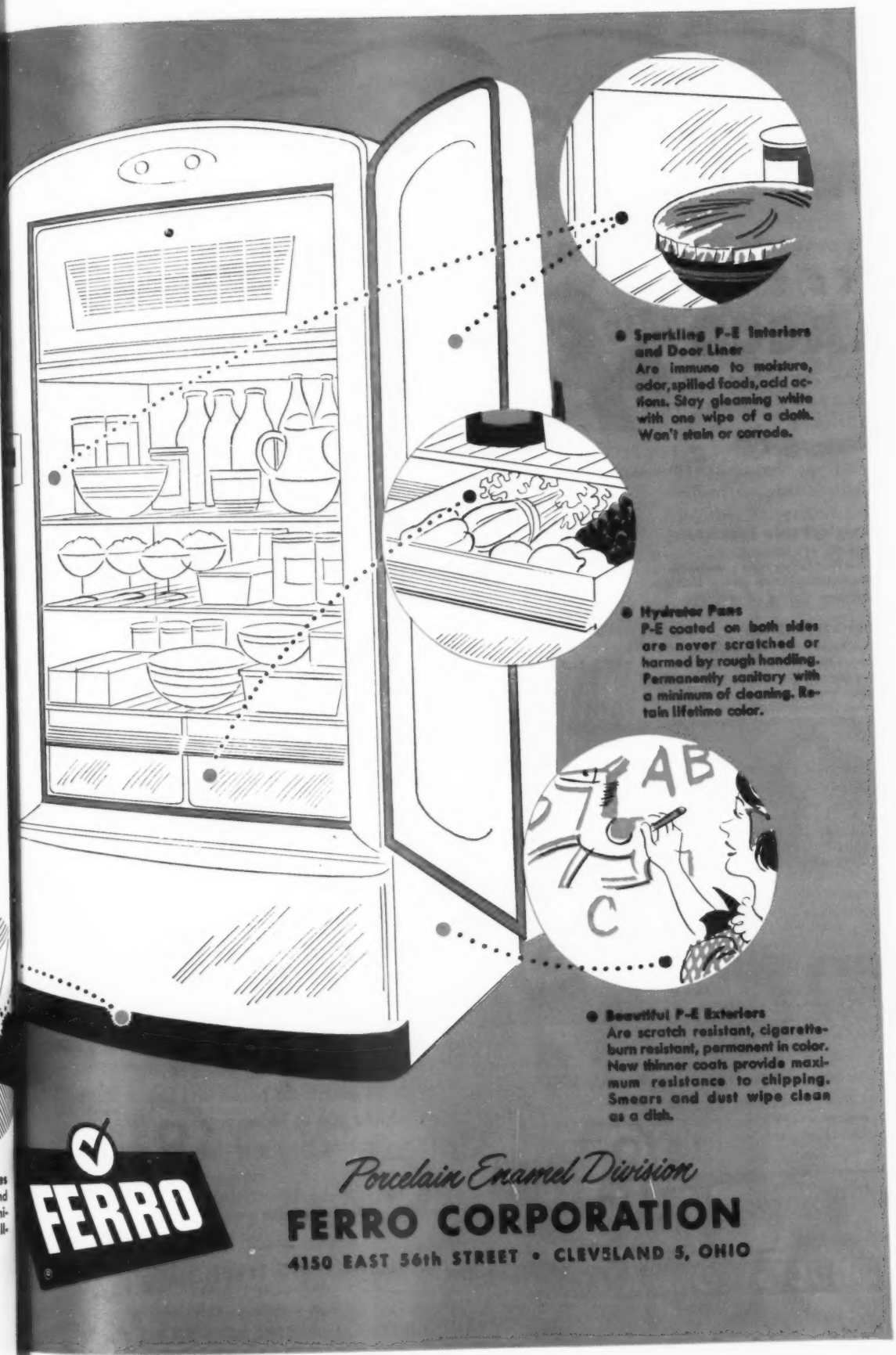
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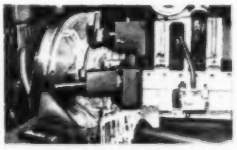

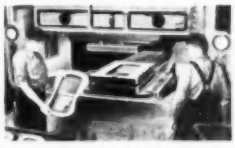

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Importance of water control in enameling

fourth in a series of articles on use of demineralized water in appliance plants

by Charles A. Fleming • INGERSOLL PRODUCTS DIVISION, BORG-WARNER CORP., CHICAGO

Exclusive feature finish

Prior to the installation of demineralizing equipment in our porcelain enameling plant, a number of enameling difficulties were encountered. They were traced directly to our water supply.

Our plant water lines were old and the source of considerable scale and rust, particularly when construction work caused disturbance in the lines. We also found carbonaceous matter and other impurities that could be screened out on 200 mesh and 325 mesh screens. These separated impurities, when ground in sample mills with an enamel batch, produced defects in the enamel coating. These defects ranged from black specks to blisters in white coats, and copper heads in the ground coats.

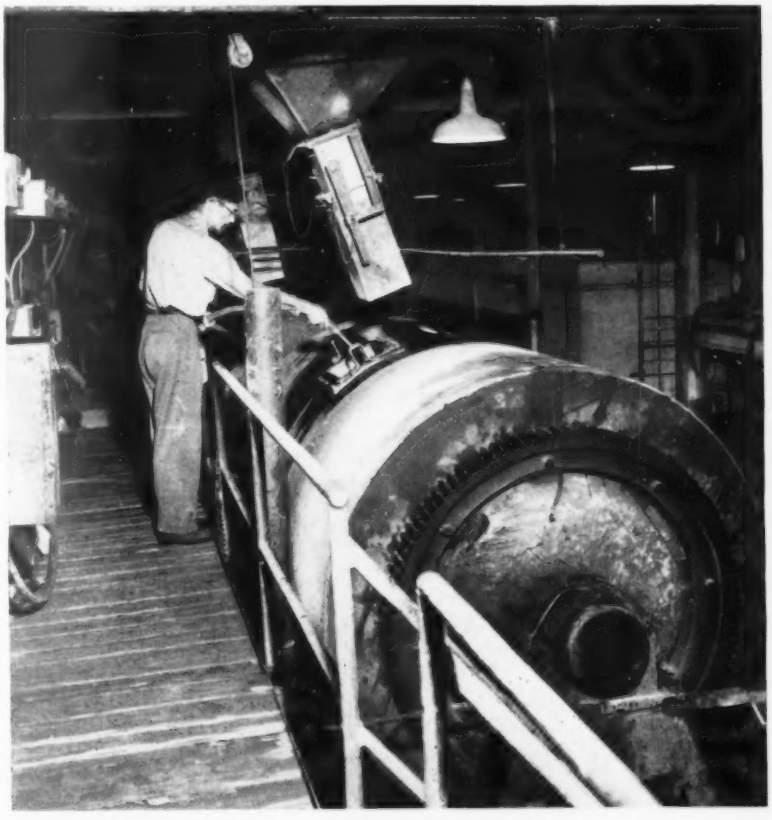
Filtering the water separated these impurities and gave us improved control over our enameling operations. The results of this change were so promising that we took an additional step and installed demineralizing equipment. The purpose of the equipment was two-fold in that the water impurities that would pass the filter operation were removed, and more complete control could be realized on enamel set, pick-up, and drainage from dipped ware.

Since approximately 80% of our ground coat is applied by dipping procedure, controls on the ground coat was a very important factor.

The demineralizing equipment greatly improved this condition and simplified the difficulty previously encountered in the dip process controls. We now encounter very little variation or change in the ground coat or white enamel slips after they are set up. The setting-up procedure is faster, involving only small additions of set-up agents to meet the desired enamel slip properties. The demineralized water is used in the mills — as the water in the mill addition, as water additions to dump the mills, to wash the mills, and as make-up water in the enamel slips.

As a further step in control, we have connected a mixing valve for steam and cold water. This enables us to circulate warm water through our jacketed dip tanks in cold weather, and thus control and maintain the temperature of the dip enamel which is an important step in controlling the set and enamel drainage. The dip tank enamel temperature is carried between 65° and 70° F. the year round. *to Page 67* →

Water control is very important in milling operations. Photo shows loading of a mill at Ingersoll Products.



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High density grinding media

including a summary of experience highlights of a number of firms

by W. Clay • KAISER METAL PRODUCTS, INC., BRISTOL, PENNSYLVANIA

THE use of high density grinding balls (aluminum oxide content) in lieu of regular grinding media (porcelain content) has been tried by some forty firms. Although the period of experimentation is still continuing, there have been some interesting results.

At Kaiser Metal Products, we have conducted controlled tests using high density grinding balls in ground coat preparation.

Grinding time reduced

Table I reveals the variation in grinding time as the mill batch was increased to a maximum of 150%. Using regular grinding media, the grinding time for 1000 pounds of frit is 2.75 hours; for high density media it was 1.36 hours. In addition, the tests reveal that 10.3% of the mill batch was retained in the mill as compared to 16.1% when using regular grinding media. It was also noted that there was an increase from 75° F. to 79° F. in the temperature of the slip when cooling water at a temperature of 44 F°. was used in the completion of grinding.

Grinding cost compared

Table II is a comparison of the cost of grinding media for a cycle of 51 millings. It should be noted that 50% more enamel is milled when high density grinding media is used, and there is a reduction in cost of approximately 22% per 1000 pounds of frit milled. Note particularly that no replacement of high density grinding media was necessary during milling nor at the dumping cycle. A similar reduction in cost was noted in the cost of power which, using regular grinding media, cost approximately 12¢ per 1000 pounds of frit milled as compared to .08¢ per 1000 pounds of frit milled when high density grinding media is used.

In order to expand the results of our experiments with high density grinding media, questionnaires were addressed to various plants also ex-

Table I

High Density Grinding Media

Variations in Grinding Time as Mill Batch is Increased to Maximum of 150 per cent*

Milling	Grinding Time (hrs.)	Frit Charge (lbs.)
1st	2½	2000 (original charge)
2nd	2¾	2100
3rd	3	2200
4th	3¼	2300
5th	3-2/3	2400
6th	4	2500
7th	4½	2600
8th	4¾	2700
9th	5	2800
10th	5	2900
11th	5½	3000
	Fineness 7-9%	

*Controlled test performed by Kaiser Metal Products, Inc., Bristol, Pa.

Table II

Cost Comparison

Regular Grinding Media vs. High Density Grinding Media (51 Millings)

Regular Grinding Media

Charge Size	Weight (lbs.)	Cost (lb.)	Total Cost
2½"	900	$0.1600	$144.00
2"	2700	0.1825	492.00
1½"	900	0.2287	206.00
Replacement During Milling			
2½"	714	$0.1600	114.20
Replacement on Dumping			
2½"	28	0.1600	4.48
Enamel Milled:	102,000 lbs.		$960.68
Cost/1000 lbs:	$9.42		

High Density Grinding Media

Charge Size	Weight (lbs.)	Cost (lb.)	Total Cost
2½"	1300	$0.1625	$211.00
2"	3800	0.1750	665.00
1½"	1300	0.1850	243.00
			$1119.00

Replacement During Milling (none)
Replacement on Dumping (none)
Enamel Milled: 153,000 lbs.
Cost/1000 lbs: $7.33

perimenting in this field. Because of the different approaches used, and the incomplete status of information, it was not possible to organize the replies. However some of the highlights of the replies are of interest.

Experiences of other firms

(a) Out of the total of 40 mills charged with high density grinding media, 19 were white mills, 17 were ground coat mills, and 4 were dry process mills. There was an average reduction of 45% in the milling time where no comparable increase in the mill charge occurred, and an average reduction in mill time of 38% with a 46% increase in the mill charge.

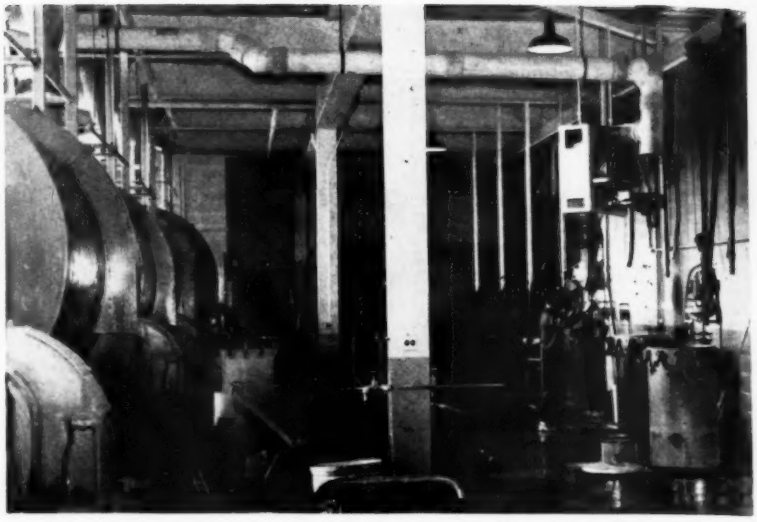
(b) The increase in the temperature of slip ranged from 5° to 9° F.

(c) The set of the ground coat increased 8 grams/2 square feet.

(d) The horsepower of the motor had to be increased about 60%.

(e) It was necessary to add an average of 7½ pounds of regular grinding media per 1000 pounds of frit milled, but only an average of ¾ pound of high density grinding media per 1000 pounds of frit milled.

(f) More wear was noted on the mill lining shells; however, it was not considered excessive. Apparently, some maintenance departments have noted an increased wearing of the gears when high density grinding media is used.



View of the mill room in the Bristol plant of Kaiser Metal Products.

Although the experimentation on the use of high density grinding media balls is still in the very early stage, certain disadvantages and advantages in their usages are apparent.

The disadvantages are rather minor and would include: (1) more wear on gears and mill lining shells, (2) increased set of the enamel, (3) increased temperature of the slip.

The advantages are very marked and far outweigh the disadvantages. The more important ones include the following:

(1) Reduction of mill time permitting greater mill room production with no increase in the number of mills.

(2) Reduction in the cost of grinding media and the cost of power.

(3) Cleaner enamel.

(4) More consistent batch yields due to uniform grinding.

(5) Less grinding media replacement during regular dumping and sorting operation.

(6) The grinding media wears down more uniformly.

(7) Smaller amounts of grinding media has to be added to maintain media charge.

"NO ONE IS EVER LATE FOR WORK SINCE THE BOSS INSTALLED THAT JACKPOT TIME CLOCK!"

Adapted for finish *from a paper before the 1952 Shop Practice Forum of the Porcelain Enamel Institute.*

ADS OUT

Eight ways to get the most from hot spray

by H. G. Beck • TECHNICAL DIRECTOR, INDUSTRIAL FINISHES DEPARTMENT, ATLAS POWDER COMPANY, NORTH CHICAGO, ILLINOIS

CONTROLLED temperature application, the process of applying pre-heated finishing materials, has rapidly advanced from a spray-room innovation to an economic necessity. Users of organic finishes should investigate it thoroughly because of its numerous advantages. In this process, heat is used to lower the viscosity instead of volatile thinners. Controlled temperature application of "hot spray" should always be evaluated on a production basis. The "casual" test should be avoided because it does not permit sufficient opportunity to make changes in initial solids, viscosity, air pressure and other variable factors. Adjustments are a part of testing new methods in the finishing room. The many benefits will repay the diligence and patience exercised in adapting hot spray to individual requirements.

Best results with specially formulated finishes

The best results are obtained from hot spray when the paint or finish used has been especially formulated for hot spray. Some advantages may be obtained by re-heating an ordinary "cold" paint, but the most complete exploitation of hot spray will only be achieved by finishes formulated especially for application by this method.

The use is not dependent upon weather conditions for good results when a finish is applied by CTA (*controlled temperature application.*)

Controlled temperature application reduces the loss of solvents and solids due to over-spray, evaporation and rubbing. These losses are substantial as is graphically illustrated in Figure 1. The data on the application of clear finishes shows that the average conventional material applied *cold* has 20% solids at the nozzle. All of the solvent — 80% — is finally lost plus at least 20% of the net solids(20% of 20% solids = 4%). Summing up, a total of 84% (80% + 4%) of the original content of a gallon of finishing material is lost. Now compare these figures with *controlled temperature application.* The original solids are 30% — with a loss of 7%, or 2% of the total content of the gallon (7% of 30%= 2.1%) plus the 70% solvents, or a total loss of 72%.

The same analysis of the figures on pigmented material shows that the net value of a gallon of material applied by controlled temperature application is 45% as against 32% for conventional enamels. (Figure 2)

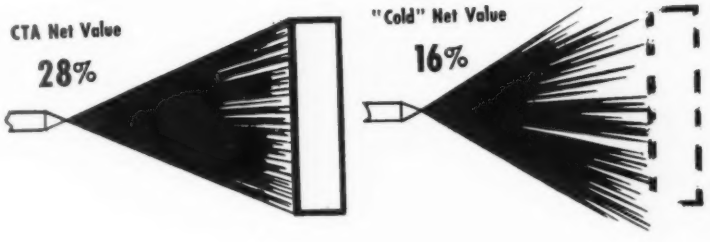
Tips for getting full value with hot spray finishing

Here are a few tips which may help you in getting full value from controlled temperature application:

1. Avoid blisters, pin holes and trapped air in the final finish by removing dust particles embedded in the pores with a heavy blast of air. Be sure that the filler or surfacer is completely dry before applying the finish by CTA. Solvent adjustment or a change in filler or surfacer may be necessary in some cases. An increase in temperature of the hot spray may be required in other cases.

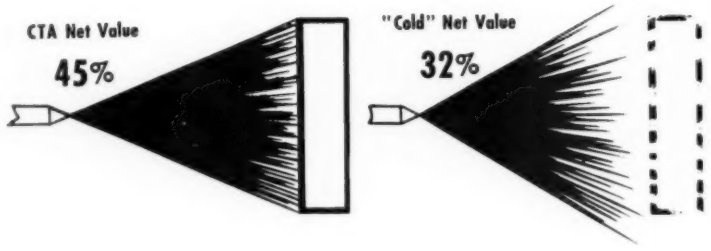
2. CTA is formulated to permit application of more solids in one coat

Figure 1



CLEAR FINISHES	CTA AT GUN	COLD AT GUN
Solvent portion per gallon	70%	80%
Solids portion per gallon	30%	20%
Air pressure	40 #	55 #
Viscosity (#4 Ford cup)	18 sec.	75 sec.
Temperature of material	160° F.	variable

Figure 2



PIGMENTED MATERIALS	CTA AT GUN	COLD AT GUN
Solvent portion per gallon	50%	60%
Solids portion per gallon	50%	40%
Air pressure	45#	65#
Viscosity ($4 Ford cup)	18 sec.	75 sec.
Temperature of material	180° F.	variable

on upright services without sags. Do not "pile on" CTA formulated materials in wasteful amounts.

3. CTA produces a fuller coat, minimized the rubbing time when rubbing is required. The best results will be obtained when extra drying time is allowed prior to rubbing CTA material.

4. Reduce "orange peel" by applying a wet, smooth film from a gun held at the proper distance from the work.

5. Do not use the same high air pressures normally maintained for "cold spray" application when using CTA materials. High pressures produce excessive fog and fumes which are wasteful and unpleasant to the worker.

6. Do not use CTA materials as stains, washcoat size coats, shading stains, toners and products with very low solids content because CTA offers no advantages over cold application with these materials.

7. When changing over from cold applications to CTA, remember that the use of high air pressure, fast motions of the gun and holding the gun too far from the work may result in lack of bonding between coats.

8. Give the same careful attention to hot spray equipment that is given to other machinery.

Examples of controlled temperature application

Here are a few examples of CTA in finishing metal surfaces:

Commercial refrigerators: One coat of white synthetic enamel replaced a coat of primer and one of enamel with equal appearance and quality. The primer and one bake operation were eliminated. Air pressure 55#, temperature 160°F.

Air conditioners: One coat of red CTA over red oxide primer produced a fuller, smoother finish than previously obtained. The hose was 20 feet longer and the gun held 6 to 8 inches from work. Air pressure 45#, temperature 160°F.

Kitchen cabinets: One and one-half mil thickness hot spray baked at 335°F for 16 minutes produced harder, more lustrous finish than prime and finish coat of cold material. Material savings 35% and labor savings 40%.

Food mixers: One coat of blued white CTA with three handlings replaced primer and enamel coat requiring six operations. Appearance improved, scratch marks eliminated. Chemical resistance is improved. Savings of 28¢ per unit are realized. Air pressure 60#, temperature 160°F.

Fluorescent light fixtures — shaped with "egg crates": Deep walls previously caused excessive rejects due to swirl of cold material sprayed at high air pressure. Air pressure 50#, temperature 160°F. Light reflection was improved due to smooth, full finish applied.

Beer coolers: One coat of CTA enamel without runs or sags produced equivalent result of primer and finish coat of cold material.

Metal caskets: CTA primer-surfacer in two full wet coats immediately following one another provided smooth surface with minimum of pin holes. Air pressure 60#, temperature 160°F.

Metal venetian blinds: Heater in this case merely brings enamel to roll coat machine at uniform temperature of 100°F.

Switch boxes: CTA black covered scratch marks in poor steel in one application.

Agricultural equipment: One coat CTA produced better appearance than primer and finish coat of cold material. Air pressure reduced from 75# to approximately 40#. Considerable handling and materials savings resulted.

Steel mop handles: Green metallic bake enamel applied electrostatically and "hot" improved appearance. 400 gallons less thinner per month.

Lawn mowers—cast iron and steel: Oil covered mowers suspended from conveyor sprayed with one heavy coat of cream-colored CTA. Air pressure 65#, hose 12 feet long. Appearance comparable to two applications of cold material.

Brass ball-point pens: One coat almost doubled the abrasion resistance over cold application. Air pressure was 70# and temperature 170° F.

A trade association can serve a multi-sided industry

third in a series of articles on the organization and operation of typical cooperative industrial trade associations

by Joseph F. Battley • PRESIDENT, NATIONAL PAINT, VARNISH AND LACQUER ASSOCIATION, INC., WASHINGTON, D.C.

THE role of industry and trade associations is well established as an integral working force for American industry and business. To be fully effective, they must tailor their operations to fit the specific needs of their members. No two associations have completely similar problems but all are working for the good of those they represent and the public.

The paint, varnish and lacquer industry, originally represented by several associations, is a multi-sided industry which includes manufacturers of paints, varnishes, lacquers, enamels, roof coatings and putty, as well as suppliers of raw materials and machinery, and paint wholesalers. In 1933, our industry associations were organized into the present National Paint, Varnish and Lacquer Association. Changing conditions had demonstrated the need for a single, well-coordinated organization.

Association objectives

Our Association has as its objective, within the limits of the law, promotion of the welfare of the industry, strengthening of business and fraternal relations among its members, the elimination of evils and customs which are contrary to sound business principles and ethics, and the safeguarding of the public interest.

Organization outline

The Executive Committee is the governing body of the Association, receiving for consideration and action at its meetings all reports, resolutions, and communications presented by the officers of the Association, chairmen of Committees and members. When, in the judgment of the Executive Committee, such reports, resolutions or communications require action by the members of the Association they are presented for such action at the annual Convention.

JOSEPH F. BATTLEY

The Executive Committee considers and acts upon any of the Association funds. The allocation of Association funds is made by the Budget and Finance Committee which reports directly to the Executive Committee. Budget and Finance Committee members are appointed by the chairman of the Executive Committee.

The president of the Association, who is elected by the members, is the chief executive officer and presides at all meetings of the Association. He makes appointments as provided in the by-laws, which include the appointment of practically all committees and is himself an exofficio member of all committees. As the chief executive officer, he is responsible for carrying out the policies of the Executive Committee which he does through the various members of his staff.

Much of the planning is done through committees composed of industry members. These have specified responsibilities. Many of them meet regularly to discuss problems or work on projects of interest to the industry. These include committees such as Credits and Collections, Industrial Product Finishes, Trade Sales, Tariff, Technical Education, Scientific, and Legislative. Some have sub-committees working on detailed subjects.

As an example, the Industrial Product Finishes Steering Committee has sub-committees on lacquer, customer relations, technical matters and industrial mobilization. The Trade Sales Committee has sub-committees on color promotion and masonry waterproofing. There are other committees which coordinate their efforts with the Trade Sales Committee because their products come under this classification. This would include putty and caulking compounds, roof coating, water paints and simplification.

To carry out the objectives of the committees, our organization consists of several main divisions, each with a director in charge and each assigned specific responsibilities. The work of the divisions is closely related one to the other. Staff meetings are held periodically in order that each staff member may be fully advised of each division's activities.

Our industry is very largely dependent upon scientific research for the development of new products and new or improved formulations of existing products. The Scientific Sec-

tion cooperates very closely with chemical and raw material suppliers, equipment makers, paint manufacturers, and government agencies, particularly the Armed Forces.

Association laboratory for industry research

As a part of the Scientific Section, the Association maintains its own laboratory where studies are constantly made on projects of interest to the entire paint, varnish and lacquer industry. For example, test methods for evaluation of paints; effectiveness and improvement of aerosol type of containers; new types of formulations to meet special requirements; and the fight against moisture in buildings which is known to result in serious structural damage to the building as well as to be responsible for paint peeling.

In connection with this study on the effect of moisture, surveys have been made on more than 1300 individual homes. The purpose of this study was the determination of how moisture gets in the walls of buildings and structures and the means by which it then accomplishes its destructive effect. The project has necessitated close cooperation with builders, architects and other members of the building industry.

The Scientific Section publishes its findings and other information of value to the industry in the form of circulars.

As part of the Scientific Section's activities, a large and complete technical library is maintained which covers the entire field of paint and allied products. A permanent librarian is in charge and abstracts covering all available articles published in the world are prepared and regularly furnished to members.

Technical training

Our Scientific Section devotes a great deal of effort to technical education for the benefit of the paint, varnish and lacquer industry. As with other industries in general, there is a large demand for trained technicians in the paint industry and, as a result of the efforts of our Association, courses for the training of these men have been established in many colleges and universities throughout the country. A textbook on furniture finishing has been prepared and is now in use at one of our Southern Universities.

The Legal and Legislative Division maintains close contact with State and National legislation affecting our industry and in cooperation with the Legislative Committee takes necessary action for the protection of the industry and the public. Other activities of this division include all matters pertaining to price and wage regulations, traffic, tariffs and the maintenance of a complete up-to-date record of all trade marks of our industry. The latest Trade Mark Directory contains approximately 35,000 listings.

The Production and Statistical Division is responsible for the compilation, analysis and distribution in compiled form of matter concerning sales, number of employees, hours and earnings, credits and collections, production and consumption of raw materials, accident reports, and price indices issued by the Bureau of the Census and Labor Department concerning the paint, varnish and lacquer industry. All information from members is treated in confidential manner.

The Trade Sales Division covers all matters relating to paints sold to retail stores, painters, builders and automotive refinishing shops. This Division also carries on special studies for water paints, roof coatings and putty. One of the outstanding activities of our Association — Paint Power Sales Training — is the responsibility of this Division. Several hundreds of these classes have been held with a high degree of success and approximately 30,000 Paint Power textbooks distributed.

Industrial finishes division

The Industrial Product Finishes Division is responsible for all matters of interest to manufacturers of paint,

to Page 54 →

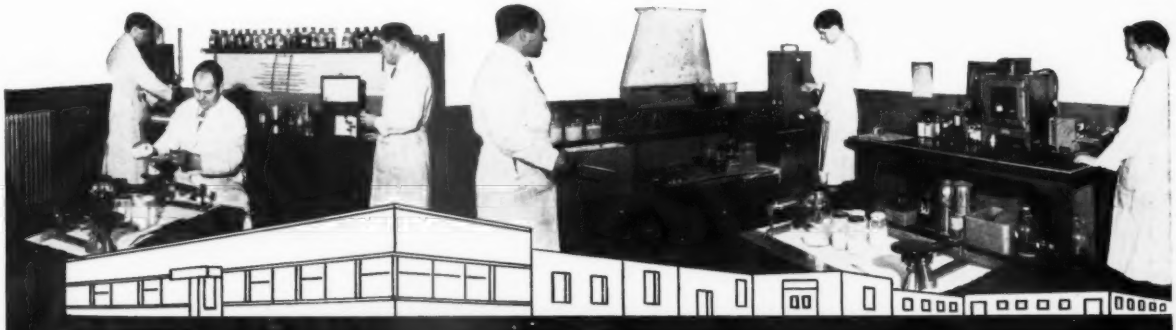
"HE'LL BE OKAY — HE HAS THOSE FAINTING SPELLS EVERY NOW AND THEN!"

Make it CLEAN!

...is just as significant in

INDUSTRY as it is in GOVERNMENT

We have elected new political leaders. We hope they do well by "Old Uncle Sam." Northwest Chemical Co. has received votes of confidence from many of you for nearly twenty years. Our platform has not been "New Deal" or "Old Deal" but a Good CLEAN Deal. On this basis we solicit your continued support and invite the support of you who have been voting otherwise. When next you are faced with a problem in metal cleaning let us show you what we can do. Send for 24-page brochure that describes all the Northwest Products.



LO pH HI

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9310 ROSELAWN DETROIT 4, MICH.

pioneers in pH cleaning control — serving you since '32

New Supplies and Equipment

K-10. New decals for appliances

New A new type decal has been especially developed for applying manufacturers identification, instructions, decorations, etc. to appliances and other finished metal products which are subjected to high temperatures.

Called the "Bak-Cal", this new transfer resists temperatures up to 400° F., making it an ideal method for applying the decal to such appliances as broilers, toasters, waffle irons, grills, pressure cookers, deep fryers, irons, ovens, heating equipment, etc.

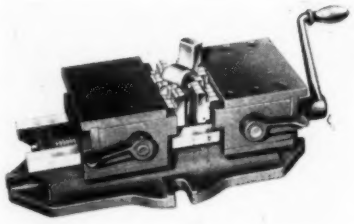
When subjected to the higher temperature, the new decal actually bakes itself into the metal or finish. It is also said to be exceptionally durable, washable, and abrasion- resistant.

K-11. Positive grip vise cuts engineering, tooling time

New Called a "mechanical octopus", this positive grip vise

More Information

For more information on new supplies, equipment and literature reviewed here, fill out the order form, or write to us on your company stationery.

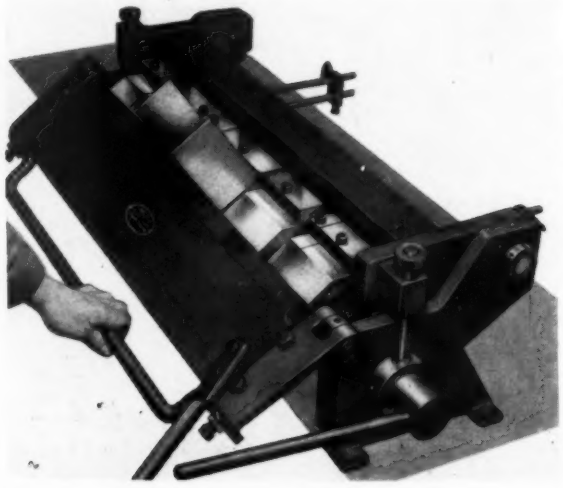


is said to slash engineering and tooling time—no jigs or costly fixtures necessary. Adaptable to all types of machine tools. After machining one piece of work that is identical with a group of others, release the jaws slightly and mold or matrix is retained ready for the next piece to be machined. No realignment necessary. Ideal for short production jobs. Vise has even pressure distribution to grip all contours of odd-shaped pieces. Serrated or plain steel jaws available.

K-12. Bench model hand-operated box and pan brakes

New A bench model, hand-operated, universal, box and pan brake is designed to be mounted on a work bench for convenience and operating ease. With a *capacity for any bending operation* on sheet metal up to 18 gauge and 24 inches long, it is ideal for model work.

Production departments will find it very useful for quantity runs on duplicate parts. The bending edge is made up of fingers in graduated widths fitted to a bar. These fingers are easily adjusted or removed as the work requires. They can be used in combination anywhere along the bending edge for folding, box and pan work, and a limitless variety of straight bending operations. Positive cam-action clamp is quickly adjustable for different thicknesses of material.

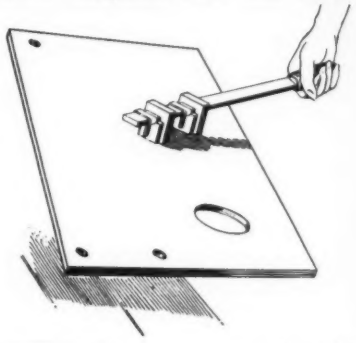


K-13. Gas-driven carton stitcher

New Economical wire stitching operations right in the field are now possible with a new mobile carton stitching machine powered by a gasoline engine. Where electricity cannot be supplied conveniently, this machine may be supplied with a 1 hp, 4-cycle gasoline engine. The unit can be mounted on trucks, pushcarts, dollies or any type of power truck equipment.

Burning regular gasoline, without oil mixture, this new stitching machine extends economical carton-stitching operations to the warehouse, the dock, the yard, the loading platform, and the field.

K-14. Magnetic lifter and feeder



New This new magnetic lifter and feeder handles stock or parts in and out of punch presses, dies, etc. Flexibility and versatility of the new tools are considered important by the manufacturer. It can be quickly adjusted for pieces of almost any size or shape and the self-aligning magnetic blocks overcome irregularities, dirt and chips.

Releases instantly at a slight twist of the wrist. Removes or inserts parts in press. Separates stacked sheets. Feeds sheets, formed parts, even castings. Also can be used for removing slugs from dies. Can be had with any number of magnets required to pick up and carry load.

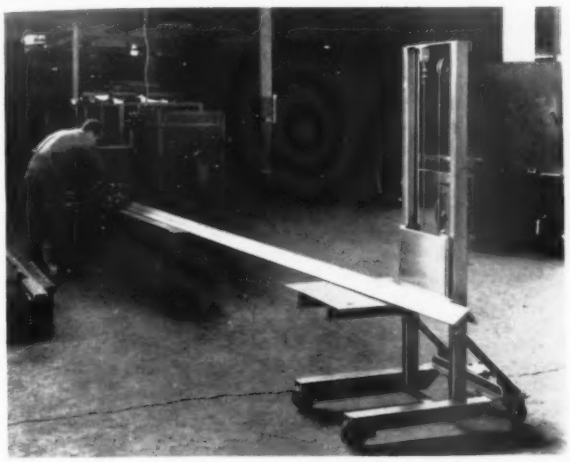
This magnetic lifter, which has almost unlimited life, may be made available for a 10-day trial.

K-15. Work positioning with convenient portable elevator

New For many work holding and positioning jobs involving long or awkward work pieces, this portable elevator may provide the most convenient method. It can hold the piece or assembly at the exact height desired, and this height can be quickly adjusted at any time during the operation.

Work applications for which portable elevators may be used include punching, drilling, welding and sawing jobs.

These units have proved adequate for a wide range of portable elevator applications such as: serving punch presses; die handling overhead maintenance; stacking materials and goods to gain floor space; handling barrels, drums and cable reels; loading and unloading motor trucks; and serving storage racks.



Units are available in three standard models with lifting capacities of 500, 1000 and 2000 pounds.

Illustration shows a long work piece being held in position for sawing.

J-16. Continuous enamelware dryer

New Utilizing a new type continuous gas-fired dryer, two leading manufacturers of porcelain enameled kitchen utensils are now accomplishing continuous drying of their enamelware in volume lots. The unit has a maximum temperature of 375° F.

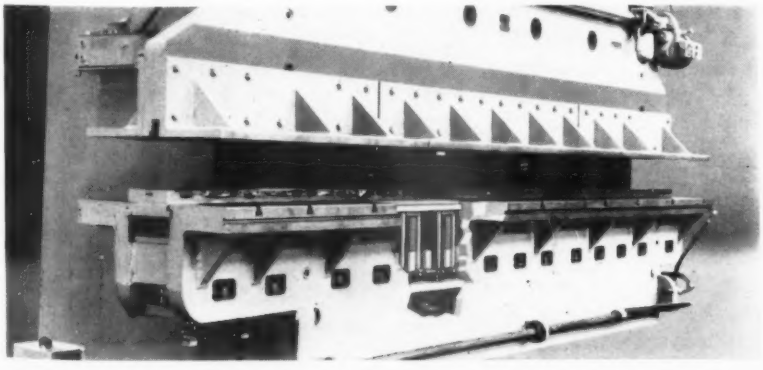
One of the plants reports that it processes one complete load every ten minutes. Average conveyor speed is four feet per minute.

K-17. Press brake for shallow draw and conventional work

New This all-steel press brake can be used for shallow work as well as conventional press work. The brake has double plate bed, 30″ wide, and 15′ 8″ in overall length.

There are 14 six-inch air cylinders mounted between plates for operating draw rings, knockout bars, and similar units. The machine weighs 72,000 lbs., has a speed of 23 stroks per minute, and has removable ram angles for press or brake operation.

Additional features include air counterbalances and horns on each end of the bed and ram.



K-18. New type ion-exchange reactor

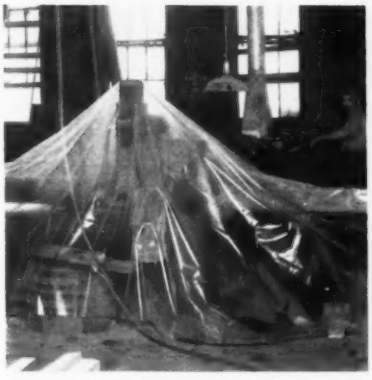
New Said to be virtually a new concept of engineering design, a new "plastic unit process" reactor for ion-exchange is claimed by the manufacturer as capable of doing everything in ion-exchange.

Used for ion-exchange, including water demineralization, it is designed for individual or multiple use and for simple or complex ion-change processes. It can be used as a pilot model prior to embarking on full-scale production.

The top lid is removable so that the regenerator tube may be fastened on for immediate regeneration when neccessary by the user.

K-19. Transparent tear-resistant tarpaulins for industrial use

New The excess weight and other disagreeable features of



old-type tarpaulins have been eliminated with the introduction of a new polyethylene industrial tarpaulin. This new tarp is extremely light weight, 1/10th the weight of fabric tarps of comparable size; completely waterproof and mildew proof; pliable in all ranges of temperature; transparent, yet tear-resistant; easily washed and dried; and will not absorb liquids or paints. The cost of the new tarps is only about 1/3 the cost of conventional tarps.

K-20. Portable yard ramp for materials handling

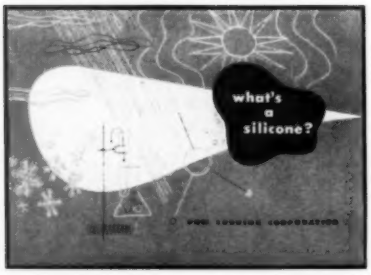
New This new portable magnesium yard ramp has been designed to solve a materials handling problem frequently occuring in industry today. This problem is to load and

unload freight cars from the ground level because no dock facilities are available or existing facilities are congested.

The yard ramp may be obtained in five standard sizes, all of which are 30 feet long, but vary in widths of 60 and 70 inches. Capacities range from 6000 to 16,000 pounds, capacity being the combined weight of the load and the materials handling equipment transporting the load over the yard ramp. Bridge type underbracing offers maximum strength with minimum weight.

Industrial literature

111. "What's a Silicone?"



This new 18-page illustrated booklet describes silicones, and their use as polishes, water repellents, fluids, release agents, lubricants, defoamers, protective coatings, electrical insulation, rubber, etc. The booklet has handy tabs for finding each section.

112. Brochure on solenoids

This data folder contains bulletins, specifications, technical data, drawings, etc. of a leading line of high quality a-c and d-c solenoids for home appliances. Included is information on snap-action switches, door switches, push-button switches, rotary selector switches, etc.

113. New color card shows thirty-two actual samples

A manufacturer of industrial finishes, industrial lacquers, thinners and lacquer thinners has just released their new color card which contains actual samples of 32 colors ranging from light ivory, through chrome orange, office green, Navy blue, royal purple, Java brown, medium slate gray and orchid to dark maroon.

114. "Finishing Engineer"

The first quarterly issue of the "Finishing Engineer" offers a graphic illustration of the story of modern engineering as demonstrated by the Cleveland engine plant of Ford Motor by a leading manufacturer of industrial washing machines. Included in succeeding issues will be articles of special interest to the metal finishing industry.

FINISH
360 N. Michigan Ave.
Chicago 1, Illinois

Please forward to me at once information on the new supplies and equipment and new industrial literature as enumerated below:

No._____ **No.**_____ **No.**_____ **No.**_____

No._____ **No.**_____ **No.**_____ **No.**_____

Name _____ **Title** _____

Company _____

Company Address _____

City _____ **Zone**____ **State** _____

At speaker's table at annual banquet, left to right: Hunter Morrison, Jr., Mrs. Howard Wolf, Mr. and Mrs. Thomas L. Baker, Howard Wolf, Mrs. Fred R. Burns, Mr. and Mrs. Wallace F. Ardussi, Fred R. Burns, and Mrs. Hunter Morrison, Jr.

Metal stampers hold annual meeting

Ardussi elected president of Pressed Metal Institute

THE annual meeting of the stamping industry's national association, the Pressed Metal Institute, was held recently at Pocono Manor, Pennsylvania. Attendance included more than 150 delegates and wives, representing nearly 70 pressed metal fabricating companies from as far away as Houston to the south and Toronto to the north.

New officers elected

Although the setting was conducive to recreational activities, the stampers did manage to accomplish much constructive work, including the election of officers.

Wallace F. Ardussi, president of Variety Machine & Stamping Co., Cleveland, was elected president, succeeding Thomas L. Baker, of National Stamping Co., Detroit.

Samuel P. Hull, sales manager, Worcester Stamped Metal Co., Worcester, Mass., was elected vice president.

Hunter Morrison, Jr., vice president, Morrison Products, Inc., was reelected secretary-treasurer.

Board of directors

The following men constitute what is said to be the Institute's youngest board of directors:

Lawson Adams, Wrought Washer Co., Milwaukee, Wis.; H. D. Berry, Thomas Smith Co., Worcester, Mass.; R. W. Breckenridge, Automatic Die & Products Co., Cleveland, Ohio; F. R. Burns, Central Steel & Wire Co., Chicago, Ill.; F. E. Claflin, Johnson-Claflin Corp., Marlboro, Mass.;

WALLACE F. ARDUSSI, PMI PRESIDENT

K. A. Honroth, Freeway Washer & Stamping Co., Cleveland, Ohio.

E. A. Irwin, E. W. Bliss Co., Canton, Ohio; W. G. Jeschke, Res Manufacturing Co., Milwaukee, Wis.; G. E. Lober, Superior Spinning & Stamping Co., Toledo, Ohio; W. K. Lomason, Douglas & Lomason Co., Detroit, Mich.; Raymond Peterson, Peterson Engineering Co., Toledo, Ohio; W. J. Primrose, Jr., The Dickey-Grabler Co., Cleveland, Ohio.

G. H. Roberts, Detroit Stamping Co., Detroit, Mich.; T. C. Roberts, Kobzy Tool Co., Chicago Ill.; C. Rose, Judson & Rose, Inc., Philadelphia, Pa.; J. P. Sellas, Detroit Metal Products, Inc., Hazel Park, Mich.; N. R. Thal, Inshield Die & Stamping Co., Toledo, Ohio; and V. G. Yawman, Yawman Metal Products, Inc., Rochester, N. Y.

Press standardization

At the business sessions, much stress was laid on the importance of developing PMI technically.

One session was sparked by E. A. Irwin, of E. W. Bliss Co., who discussed "Press Standardization from a Press Builders Viewpoint." Irwin covered in detail the work of the Joint Industry Conference whose purpose is to bring together engineers and technicians representing both user and supplier groups, to discuss common problems on an industry-wide basis.

Press standardization, stated Irwin, has as its prime objective the standardization of die space, stroke, bed and slide areas and other dimensions essential to acquire the interchangeability of dies between presses of like tonnage and die space areas, regardless of press manufacturer.

Irwin urged the participation of PMI members in the Joint Industry Conference as they represent the largest single segment of press buyers.

Stamping arithmetic

Statistics, as applied to the stamping industry, was the theme of an address by Orrin B. Werntz, PMI managing director. His talk was en-

Board of directors and officers of Pressed Metal Institute: First row — R. W. Breckenridge, F. R. Burns, W. F. Ardussi, Hunter Morrison, Jr., Orren B. Werntz (PMI); Second row — W. K. Lomason, V. G. Yawman, Raymond Peterson, K. A. Honroth, W. G. Jeschke, F. E. Claflin, C. G. Rose, E. A. Irwin; Third row — Claude Rainey, T. C. Roberts, H. D. Berry, N. R. Thal, W. J. Primrose, Jr., Lawson Adams, E. M. Ross (PMI).

titled "Business Arithmetic in the Stamping Industry — An Aid to Management."

"It is unfortunate," stated Werntz, "that management often rates its individual company's success by comparison with only itself as to prior years, and pays little attention to the passing parade—either as he passes it—or it passes him."

Werntz presented some pertinent statistics relative to the growth of the stamping industry, including the number of companies, sales volume, and consumption of sheet metal—1939 compared with 1947. In 1939 there were 965 stamping establishments compared to 1,951 in 1947—an increase of 105%. Sales volume in 1939 was $326,291 compared to $1,164,299 in 1947. In 1939, the industry consumed a total of 710,000 tons of sheet and strip low carbon, hot and cold rolled; in 1947, 1,906,000 tons. In 1939, this was 25,000 pounds per employee; while in 1947, it was 33,400 tons per employee, an increase of 33%.

Potential stamping customers

He suggested that PMI members should check into the fields which offer the greatest future for stamping sales. Some 50 industries had startling increases in value added from 1939 to 1947, and at least 14 of them use stampings. "These industries must account for some of our growth. They must represent a fertile sales field. The largest users were motor vehicles, radios and refrigeration.

"The largest per cent of increase went to auto trailers, frozen foods, household machines, laundry equipment, conveyors, industrial trucks and tractors, television, electrical appliances, electrical welding apparatus, aircraft, safes and vaults, oil burners, industrial ovens and furnaces, blowers and fans," Werntz pointed out.

S. P. HULL, PMI VICE PRESIDENT

Cost control

Claude O. Rainey, secretary-treasurer, Morrison Steel Products, Buffalo, N. Y., gave an excellent presentation of "Cost Control in the Stamping Plant." A PMI spokesman stated that he believes Rainey's address will rapidly become a "bible" to the cost-conscious executive.

Safety committee

At a meeting of the Safety Committee, it was brought out that the PMI "safety manual" will be ready for distribution to Institute members soon. It was indicated that this manual, together with the industry's overall safety program, will be the opening gun in concentrated drive to reduced accidents in the pressed metal industry.

Associate members meet

At a meeting of PMI associate members, plans were revealed for holding improved technical meetings both at district and national meetings.

Certificates of merit

At the annual banquet, Certificates of Merit were presented to Thomas L. Baker, of National Stamping Co., Detroit; Raymond E. Peterson, of Peterson Engineering Co., Toledo; Joseph J. Boehm, of the Boehm Pressed Steel Co., Cleveland; and James M. Leake, of The Leake Stamping Co., Monroe, Mich.

These certificates, which represent the highest PMI award for service, were presented to Baker for his efforts in promoting the advancement of the Institute into a nationally recognized trade association; to Peterson and Boehm for their work as co-chairmen of the Technical Research and Standards Committee; and to Leake for his work in promoting the advancement of stampings through the preparation and dissemination of technical papers (one of Mr. Leake's

to Page 56 →

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for longer life cleaning

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THE finish LINE

HOW WHITE IS WHITE— is a rough way of stating a question that has been causing concern among the producers of all types of metal finishes, the manufacturers of all kinds of finished metal products and the consumer-users of the finished products for a good many years.

To state the problem simply and from the practical standpoint we raise the question—"Can white finishes for metal products formally used in groups (kitchen appliances for example) be standardized for color characteristics as the consumer-user sees them?" We believe that the answer can and should be "yes." At the same time we hasten to comment that the problem is not as simple as it appears in print and that the solution will be one that calls for the combined use of available technical skills and a spirit of cooperation between all of the segments of industry that are involved.

A technical and practical problem

If we were to start a discussion of the technical problems involved we would be using such terms as: spectrophotometer, reflectometer, diffuse and specular reflectance, Munsell notations, hue, value, chroma and other technical designations that are important to the technician and research but need not be included in a strictly "practical" evaluation of the problem.

We have received inquiries at finish from companies, large and small, concerning an existing source for a standard white that individual finished product manufacturers could voluntarily use for their own benefit and for the convenience of the final customer.

These inquiries raise two questions: (1) should white for metal products — particularly appliances for kitchen and laundry — be standardized, and (2) is there a technical and practical solution to the question of standardizing white finishes?

In our opinion, it should be possible to come up with an affirmative answer for both of the questions. However we are not primarily interested in our opinions. We are interested in determining the degree of interest in the problem, the possibility for getting action, and the chance for cooperation among metal products manufacturers, particularly those making major appliances.

Work has been done

We would be remiss in opening the question editorially if we failed to report the fact that considerable work has been done by important technical men in the appliance and finishes field over a period of years.

Some progress has been made by individual manufacturers in attempts to standardize white for appliances of their own make which are to be used together.

Some cooperative work has been carried out during recent years by technical representatives of major appliance producers and from the suppliers of both organic and ceramic finishes.

The National Electrical Manufacturers Association has a "Joint Section Committee on Color of Kitchen Appliances" which has held productive meetings and appears to be wearing an approach to the problem.

Another opportunity for cooperation

It will be evident even if it is determined that white standardization is needed and wanted — and that it can be technically and practically accomplished — that even then there will be the question of cooperation by the majority of important manufacturers before the assumed ultimate benefits will accrue to producers and consumers.

We will make the same offer that was made in connection with the now eminently successful National Safe Transit Program when the cooperative plan was first suggested by finish. We will help by offering an editorial sounding board for ideas and opinions and for promoting a standardization if and when it is proved to be desirable and practical.

Any finish reader interested in this problem is encouraged to express an opinion. Just state whether it represents a personal or a company opinion when you write.

Dana Chase
EDITOR AND PUBLISHER

13

finish APRIL • 1952

Home laundry industry interested

Evidence of interest in this editorial campaign in *finish* to encourage the standardization of white appliances for kitchen and laundry was indicated at the American Home Laundry Manufacturers' Association summer meeting at Mackinac Island.

During an open forum, a request was made that the editor of *finish* elaborate on the information that has been presented in these editorial pages. Roy Bradt, of The Maytag Company, and others voiced approval of such a campaign. Doubt was expressed that the entire industry could arrive at a precise single white, but the desire to get away from the dirty "grays" and the present wide variation in shades of white strongly encourages the idea of setting up a standard to which each manufacturer can "shoot."

W. C. O'Connell, of General Electric Company, explained a few of the technical difficulties which tend to complicate a standardization plan and obviate the possibility of 100% standardization. Mr. O'Connell, however, is in sympathy with the move for standardization, and General Electric Company has been cooperating with the National Electrical Manufacturers Association Committee in connection with its standardization efforts.

How we

sixth in a series—[illegible] repo
rum, and letters fro[illegible]rs of

Beam Manufacturing Company

To *Finish:*

For the past few months, we have watched with interest the articles that *finish* magazine has published in regard to the establishment of a standard white for the home appliance industry. Bob Sampson, our purchasing agent, tells me that you conveyed to him your confidence that the standardization of a universal appliance white is technically possible and practical. This is good news to us, as we constantly are confronted with parts coming from two or more sources which have to be matched to our own white enamel.

The purpose of this letter is merely to express my opinion that this project is worthy of the work that it will most certainly take to promote it. If there is anything we can do to help on this program, please do not hesitate to let us know.

John Patrou

te is white?

**report of a home laundry industry fo-
rs of appliances, and industrial finishes**

The Maytag Company

To Finish:

We had some correspondence a year ago regarding the possibility of arriving at some standards of white, and later on it came up in the Mackinac Island meeting in a forum discussion.

I would like very much to see this matter pursued some time in the not too distant future to see if a color of white can be arrived at, which would act as a standard and for which every manufacturer would set his color pattern.

This matter has received significant impetus in the past year or so with so many new homes being built and with so many home appliances going into the kitchen or the laundry room where there are other white articles and where it is of the utmost importance that the white in a washer or dryer or ironer match the white in the refrigerator, stove and other kitchen finishes. I don't know how such a standard could be brought about, and, of course, there would be no compulsion on a company to use it, but if anyone did want to use a standard white, it would be available for that purpose.

Roy A. Bradt
Vice President

The Glidden Company

To *Finish:*

You are to be congratulated for your interest and enthusiasm in your "How White Is White" program. Publications of this nature oft times cause industry wide improvements. We will be happy to assist in any way we can.

Your questions and the editorial comment, as well as the many responses in the "How White Is White" section of *finish* magazine will no doubt highlight a real opportunity for many to come closer to supplying their customers' needs—namely, standard uniform white color on all white appliances installed in one area in the home, even though they are made by various manufacturers, stored under various conditions for various periods of time, and aged after installation for various lengths of time.

Substantial improvements in color uniformity can be achieved through the adoption of not only a standard white color for various appliances at the time of production, but also controlling as far as possible the various factors which cause color change, discoloration or surface accumulation.

Perhaps a Technical Advisory Sub-Committee Council or the Joint Sections Committee on Color should be formed under the Inter Society Color Council or the Joint Sections Committee on Color of Kitchen Appliances of the National Electrical Manufacturers Association.

A compilation of the known facts in agreed form with wide spread distribution and acceptability could create a consciousness of the various causes of the problems in many circles where they are not recognized at the present time.

The Glidden Company would be glad to place at the disposition of such a committee its knowledge of the technical factors of application, curing, storing and aging of organic coatings, as well as test programs to predict color variations.

A. D. Duncan
Vice President

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Designing a protective coating course at the university level

background information for the university and for industry, including an outline of a successful integrated course now in operation

PART II

by L. L. Carrick • PROFESSOR, DEPT. OF CHEMICAL & METALLURGICAL ENGINEERING, UNIVERSITY OF MICHIGAN; AND FINISH TECHNICAL CONSULTANT

Exclusive feature finish

In Part I of this two-part article, we presented background information for educational institutions and industry. This concluding part presents facts of importance in integrating a protective coatings course.

Four factors in integrating a protective coatings course

The protective coatings course, in the opinion of the writer, requires carefully integrated training. There are at least four factors in integrating a protective coating course:

a. The qualifications of the teacher,

b. The arrangement and integration of subject matter of the various courses,

c. The extent of training, as —

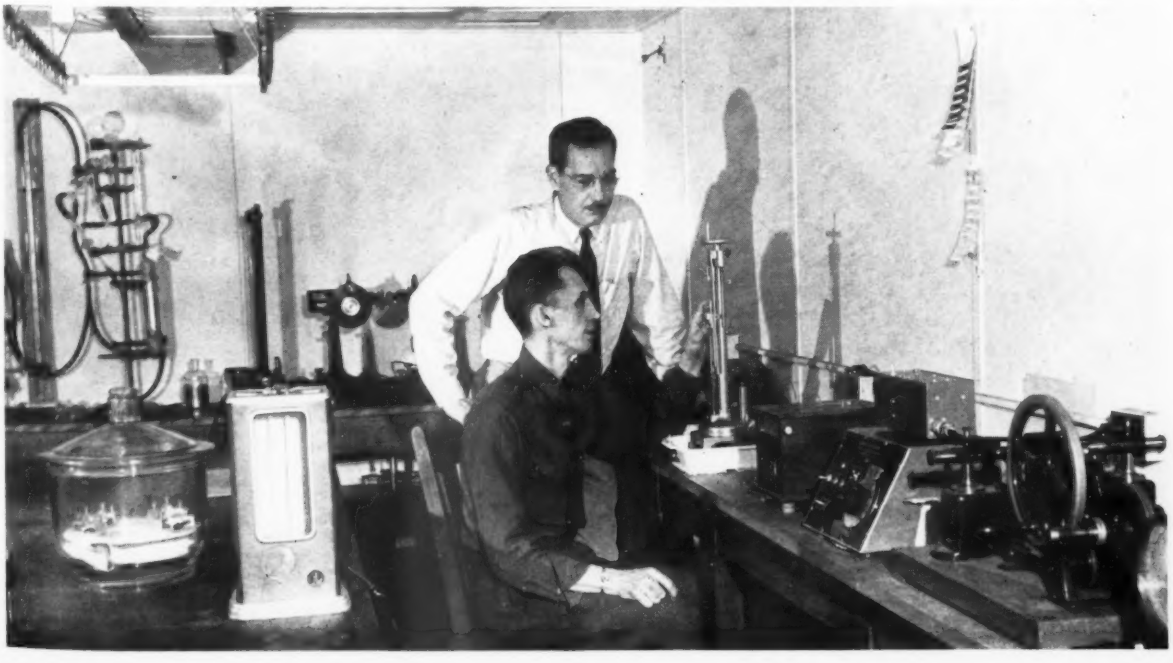
1. Senior required courses or senior required technical electives in an undergraduate senior's Bachelor's course in chemistry or chemical engineering,

2. Graduate courses and research leading to the Master of Science Degree in protective coatings,

d. The laboratory requirements for routine evaluation of protective coatings.

The teacher should be one who has a broad background in teaching and realizes that the student learns primarily by doing rather than by listening. Also, he should have sufficient experience in the field to recognize and cope with industrial problems in the laboratory, as well as in the classroom. In addition, the teacher should have a background in more than one field. He should have a clear working knowledge of chemistry, chemical engineering, physics, electro-chemistry, botany, zoology, bacteriology,

Section of the constant temperature humidity room where much research is conducted at University of Michigan.



economics, personal relations, psychology, and a rigid mathematical training. The teacher who is deficient in any of these points may eventually rise through perseverence in the protective coating field, but his induction period is longer than the industrially trained teacher. Personnel with these qualifications may be hard to find, but where an integrated course in the protective coatings field is taught, these requirements may be met.

Training teachers and industrial personnel

Not only from the standpoint of training teachers is a good course in protective coatings needed in our colleges and universities, but also to train the many more protective coatings personnel to handle the many changes in a rapidly expanding industry and to replace existing personnel as they drop out or retire. With the high competition in the field, the continual changing in the formulation of existing requirements, and the many new uses for protective coatings continually being presented to the manufacturer, the industry requires a maximum of open mindedness and active, clear-cut thinking to meet these changes. Personnel of this type of training do not grow as Topsy; they must be cultivated.

The subject matter of a protective coating course should be thoroughly integrated. No teacher should jump from one phase to another phase of the protective coating field and try to superficially cover all phases in a short course. He should learn that the material, while it might be clear in his own mind, is new to the student. Thus, if you intend to study varnishes, do not study pigments or some other phase of the subject.

The basic idea for students who wish to qualify as laboratory technicians, and possibly spend several years in the laboratory learning methods of formulation of various varnishes, may be met by taking the "100" courses and combining them with the "266" course. In these courses the student learns about pigments, oils, thinners, driers; of methods of physical and chemical control of raw materials and finished products; and, in addition, basic ideas concerning the use of dispersion machinery and varnish cooking. The work requires a background in analytical, organic and physical chemistry. It is usually taken by seniors who major in the field of chemical engineering or chemistry. As a group, the majors in chemistry make better laboratory technicians and ultimately may grow into research formulators, color matchers and—if mechanically inclined and their personality is suitable—they may become departmental foremen. Some of these men may in time develop into excellent technical sales service or salesmen personnel.

The majors in chemical engineering, while they make good laboratory technicians, soon develop into departmental foremen, plant superintendents, technical sales service or salesmen personnel.

The integration of the course as used by the author is summarized in this chart. It may be noted that there are three distinct levels of subject matter. The "100" courses are required before taking the "200" courses; and the "200" before taking the "300" courses.

Number Course	Name of Course	Hours Per Week	Remarks
Chem. & Met. 136	Pigments	3	Manufacture, physical and chemical properties of pigments pertinent to their use in paints, enamels, and lacquers; a descriptive, mathematical and design presentation. May be taken by seniors in chemistry or chemical engineering.
Chem. & Met. 137	Oil, Thinners and Driers	3	Manufacture of synthetic thinners, driers and oil, processing of vegetable oils, and physical properties as related to pigments, oils, thinners, and driers, a descriptive and chemical presentation based on organic and physical chemistry and chemical engineering, botany, etc. This course may be taken by seniors in chemistry or chemical engineering.
Chem. & Met. 266	Protective Coating Laboratory	12	Actual formulation, chemical and physical testing of raw materials, finished products and the pilot plant, laboratory preparation of paints, lacquers, enamels and varnishes. May be taken as graduate credit or simultaneously with Chem. & Met. 136 or 137.
Chem. & Met. 237	Synthetic Resins	4	The chemistry of manufacture, the chemical relations which exist between: oil and pigments, natural and synthetic resins, and their characteristics; their use in formulation of vehicles and the properties of many such vehicles produced. A graduate course which requires general work in pigments, oils, thinners and driers.
Chem. & Met. 337	Varnishes	3	Varnish plant design; cooking and thinning, including kettles, fume control, filtration, clarification, storage, transportation of fluids, etc., of synthetic and natural gum varnishes. Natural resin varnishes contrasted with synthetic resin formulations. Common and many special varnishes. Taken by the second or third year student, depending upon background.
Chem. & Met. 336	Paint, Enamel, and Lacquer Formulation	5	In this course exterior and interior paints for wood, steel, concrete, galvanized iron, etc., are formulated; studied in relation to ultraviolet light, corrosion, surface preparation, resistance to moisture, fumes, permeability. Special finishes for furniture (wood or steel), automobiles and appliances, which have special preparation, are studied. Dyes and stains. Taken by second or third year students, depending upon background.
Chem. & Met. 210	Research		Topics pertaining to protective coatings, more or less practical, as well as theoretical.

For the graduate student

The graduate student either has had or must take the basic protective coating courses (100's) designed for senior students in chemistry or chemical engineering and, in addition, he goes into the more scientific approach of protective coating formulation, varnish production, design of special varnishes to meet set specifications or to write specifications to meet special requirements where specifications are not available. These men develop faster in the laboratory or plant, and are capable of assuming responsibility after a short period of contact with a given organization. Their field of endeavor is not as limited as that of the undergraduate student. They constitute the group of men, in general, who will assume control of the industry in the future and blaze the way to a more rigid scientific approach and control of production. It is to men of this class we look for improved design of equipment, strict scientific interpretation of problems, replacement of the self-made protective coating personnel, and future personnel for presidents and boards of directors. With their background in economics, personal relations and scientific training, they will be in a position to evaluate the ideas of the research department and not only talk the language of the scientific personnel in their employ, but render economically and scientifically sound decisions.

Machinery & testing equipment for the training laboratory

The student upon graduation with the degree of Bachelor of Science in Protective Coatings should lead the field of regularly graduated chemists and chemical engineers by at least one or two years of plant training. To do this the laboratory for protective coating majors should be equipped with the machinery and scientific testing equipment that is found in the average industrial laboratory. There is just as much point in trying to teach a laboratory course without the necessary equipment as there is to try to teach an individual to ride a bicycle without the bicycle. No amount of classroom discussion will teach the proper use of a machine.

The protective coating field has suffered in the past, and suffers in some instances today, from the employment of men with little or no background in the field (high school or general college graduates). These men may develop into good technicians, salesmen, foremen, and other personnel of a factory, but for every one who so develops, have you stopped to consider how many more have fallen by the wayside, simply by taking the path of least resistance, and have become routine factory men or routine laboratory helpers? In this field many become discouraged because of their lack of advancement and change to some other industrial field, with the corresponding loss in time and training cost to their original employer. If there is no course for training protective coating personnel from which he may draw new personnel, the employer is facing a continuous cycle of training and retraining.

A steady demand for university-trained personnel

Since so few universities have included protective coatings as a curriculum offering, the available openings far exceed the available trained personnel. Normally the author has been unable to fill more than 10% of the requests for university-trained protective coating personnel. This request for university-trained personnel has been steady for the past fifteen years, and there is no apparent let-up in sight. This steady demand indicates the protective coating industry recognizes the superiority of the university-trained candidate.

"IT WAS THE BOSS'S IDEA, HE TOSSED ME IN HERE"

A trade association can serve a multi-sided industry

(Continued from Page 40)

varnish and lacquer specifically formulated to meet the requirements of a product manufacturer and applied to that product as a part of the manufacturing process. Committee meetings representing the various sections of this branch of the Industry are held periodically and information of value to Industrial Product Finishes manufacturers from these meetings is published for the benefit of all such manufacturers.

The Promotion and Development Division issues weekly releases, radio scripts and booklets. It prepares articles for national magazines and assists writers in the preparation of articles concerning our industry. Through the medium of women's clubs, farm groups and civic organizations, information concerning our industry's products is presented to their members.

Our Public Relations Division issues a weekly publication for the up-to-date information of association members and prepares articles for trade and business magazines. It also coordinates publicity for other association divisions and maintains contact with government agencies, trade associations and others in the interest of the paint, varnish and lacquer industry.

The National Clean Up — Paint Up — Fix Up Bureau is another highly successful activity of ours. The basic idea, of civic improvement, was originated by a St. Louis publisher. The idea grew to such an extent that it required a national organization to handle it. The charger was transferred to the National Paint, Varnish and Lacquer Association which established the Bureau as an independent activity to handle the affairs of the Bureau.

A total of 5,012 cities and towns throughout the country conducted Clean Up — Paint Up — Fix Up Campaigns in the spring of 1952. These campaigns were endorsed by civic leaders and involved the voluntary cooperation of 80 million citizens, school children and business leaders. In many cities permanent commissioners have been established to maintain the standards of cleanliness, fire protection, safety and improvement of property resulting from the program.

Awards are made each year to the cities or towns holding Clean Up — Paint Up — Fix Up Programs. Three awards are given in each of eight population groups and also a national award to the community with the most outstanding record of accomplishment.

Emergency defense service

At the outbreak of Korean hostilities, an Emergency Service was established to keep our members fully informed regarding regulations concerning wages, prices and allocation of materials. Each member was given specific responsibilities and maintained daily contact with the government agencies to which he was assigned. We always maintain a policy of the fullest cooperation with the government bureaus, furnishing them with information and factual data whenever required.

Our three-fold purpose is complete service to our members, presenting the industry to the public in an honorable and conscientious manner in order to achieve a better and fuller appreciation by the public of the products manufactured by our industry. We believe we have established a creditable reputation for our industry but we know we must not remain static. We must be ready at all times to meet changing conditions and shift operations speedily and efficiently when a new service is necessary. Trade associations must be adaptable to the requirements of their members and be sufficiently flexible to meet challenges when they are presented.

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1. Is my present cleaner as good as that used by other leaders in my manufacturing field? Have I reviewed today's trade practices recently for the best all-around results from cleaning?
2. Is my cleaner based on *fused* alkalies that dissolve quickly and completely—or do I really get only "halfway" efficiency?
3. How about anhydrous, active ingredients? Am I actually paying freight and storage on water and fillers?
4. Will my present cleaner still give good results under such tough conditions as low temperature . . . heavy soil load in the tank . . . overlong periods between recharging? Or must I figure on rejects?
5. Will it tackle such difficult jobs as removal of heavy grease load . . . compounded and impacted soils . . . buffing compound . . . and still rinse free and clear?
6. Do I get the kind of qualified technical assistance from my supplier that I need to get the optimum results from cleaning?

You can get help on all these problems with Pennsalt Metal Preparation Service

If you have any doubts about any of these questions your answer lies in Pennsalt Metal Preparation Service.

Here you will find a complete line of soak tank cleaners which are in use in the country's leading plants . . . performing tough jobs well . . . holding down rejects.

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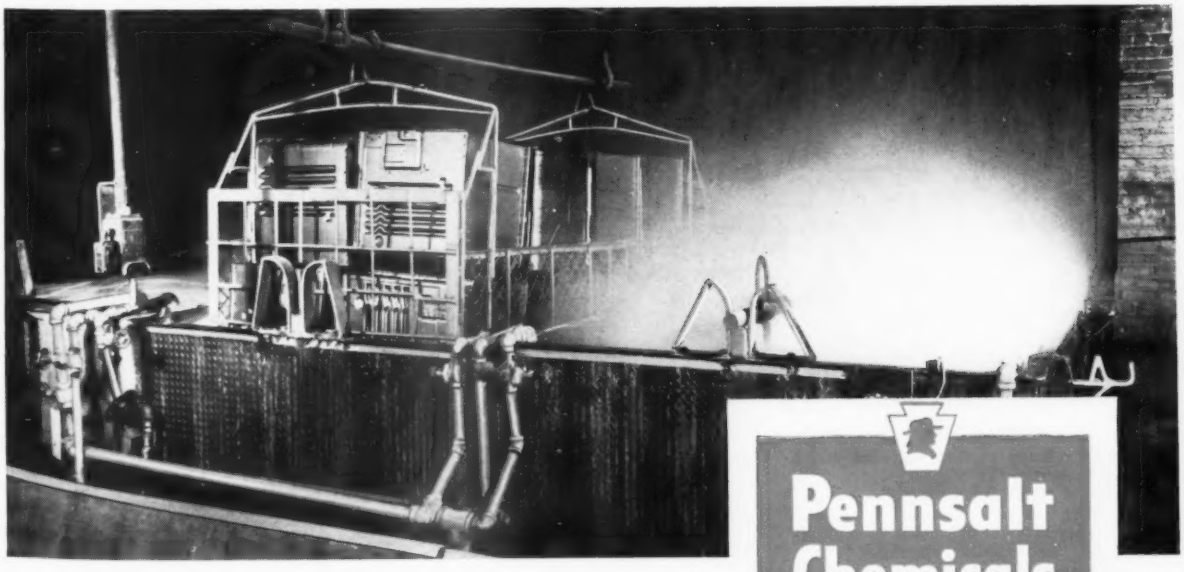

Pennsalt Chemicals

PENNSALT CLEANERS...A BETTER START FOR YOUR FINISH

Stampers hold annual meeting

→ *from Page 46*

papers, "*How Modern Stamping Techniques Can Help Conversion,*" was published in May, 1951 *finish*).

4th technical meeting

In his annual report, Orren B. Werntz, PMI managing director, announced that PMI's 4th Spring Technical Session is scheduled for late in March, in Cleveland. Pointing up the growing importance of these technical meetings, he stated that the first meeting drew an attendance of 140 men representing 80 companies, with last year's meeting drawing an attendance of 190 men representing 105 companies.

Werntz also mentioned some other projects which are being planned, including the publication of a revised Blue Book of stamping companies, and the distribution of commercial manufacturing tolerance data. The PMI Safety Committee has been working the past year on a program to be released to members for a concerted drive on safety, starting Jan. 1.

Philadelphia selected as site for next annual meeting

The Pressed Metal Institute's next annual meeting will be held at the Bellevue-Stratford Hotel, Philadelphia, in October, 1953.

ASTM Committee C-22 survey reflects strong interest in porcelain enamel and ceramic coating symposim

COMMITTEE C-22 of the American Society for Testing Materials conducted a mail survey recently to obtain suggestions and opinions concerning a proposed program for a Symposium on "Porcelain Enamels and Ceramic Coatings as Engineering Materials," to be presented at the 1953 annual meeting of the ASTM. This survey was, to a limited extent, international in scope, with some replies being received from England, Canada, and South America. Of 670 letters mailed out, there was 40% return or 268 replies. These were received prior to October 1 when the first review of the information was made by Dwight G. Bennett, symposium committee chairman. The accompanying table shows the relative interest indicated for 11 suggested subjects included in the original survey.

A cross section of 144 suggested subjects

The following listing is a cross-section of 144 different subjects suggested in the answers received:

Properties and uses of vitreous enamels on aluminum.

Testing of suitability of steel for enameling.

Liquid metal attack and corrosion.

Fundamental structure of glasses and enamels in relation to their physical and chemical properties.

Coating of laminated materials.

Hot water attack; effect of water at ambient temperatures and down to 40°F.

Coatings for exhaust manifolds and turbo chargers in diesel engines.

Ceramic coating of platinum wire.

Effect on temperature coefficient by coating.

Use and effect of lead oxides (and silicates) in coatings.

Use and effect of antimony trioxide in coatings.

Resistance to alternating freezing and thawing.

Thermal insulation of ceramic coatings (emissivity).

High temperature fatigue properties.

Porcelain enamel as a part of metallurgy.

Infra-red emissivity of porcelain enamel.

Enameling chromium stainless steels.

Reaction to electron bombardment.

Printing inks for vitreous enamel.

Corrosion by leaded fuels.

Influence of repeated firing on ground coat bubble structure where ground coat and white titanium cover coat are fired at same temperature, and where as many as three cover coat applications to same piece of ware make successive firings necessary.

Emissivity and radiation characteristics.

Coatings for the interior of small vessels used with corrosive chemicals.

Non-destructive tests.

Torsion.

Thermal conductivity of ceramic coatings, both by radiation suppression and low conductivity, for use in protecting sheet alloys from very high temperature gases.

Corrosion of interior of open top r.r. cars, i.e. hopper and gondala cars and economical and efficient coating for decreasing corrosion.

Repair of ceramic coatings.

Resistance to attack by aviation gasoline exhaust deposit sludge.

High temperature (1800-2000°F) oxidation resistance in air.

Ceramic coatings on engine exhaust stacks.

Simple standard (preferably short line) testing methods for the comparison and evaluation of coatings. Specifically it is desired to evaluate the following: (a) Thermal shock resistance; (b) Impact resistance; (c) Elevated temp. oxidation and corrosion resistance; and (d) Resistance to high temperature flow and/or erosion.

Applicability of coatings to various alloys.

Prevention of gas absorption by titanium through the use of ceramic coatings.

Ceramic coatings on magnesium castings.

Frictional properties at high temps.

Controlled atmosphere firing.

Effects of protective commercial heat treating atmospheres on ceramic coatings.

Ceramic coatings for molten zinc hot dip tanks.

These suggestions were received from raw material suppliers, equipment and finished product manufacturers, railways, air lines, instrument companies, and government and defense laboratories.

It is expected that from the many suggestions made, an important and valuable program on engineering properties will result for presentation at the 1953 annual meeting of ASTM.

Topics already suggested	*Your interest in such topics* Primary	Secondary	No Interest
The Resistance of Porcelain Enamels and Ceramic Coatings to:			
1. Abrasion	85	87	28
2. Alkali Attack	82	66	23
3. Acid Attack	91	69	42
4. Hot Water Attack	54	56	44
5. High Temperature Corrosion	137	30	27
6. Weathering	51	66	45
7. Thermal Shock	119	54	19
8. Impact	111	57	16
Strength added to steel by porcelain enamel	50	61	48
Electrical Resistance of Enamels at high temperatures	35	53	64
Coatings, effect of, on Al, Cu, Ti, etc.	58	60	65

ADS OUT

Porcelain enameled panels line Elizabeth River tunnel ceiling

by W. E. McFee • ARMCO STEEL CORPORATION, MIDDLETOWN, OHIO

ANOTHER famous old ferry was washed off the water with the opening of a new 3,500-foot tunnel under the Elizabeth River between Norfolk and Portsmouth, Virginia. Traffic is heavy between these two cities and necessitated a bridge in addition to the tunnel. Construction cost of both was about 16 million dollars. The tunnel accommodates pedestrian as well as vehicular traffic.

One of the features of the Elizabeth River Tunnel is a flat, suspended ceiling constructed of porcelain enameled panels. Each panel is 7′—6½″ long by 2′—6″ wide, formed from 14 gage enameling iron, with 3-inch flanges, and filled with concrete. There is an expansion joint every 23 feet. Porcelain enameled panels are also used at each entrance.

All told, there are 61,766 square feet of the suspended-type (3,276 panels) in the ceiling area; and 13,575 square feet of the directly attached type (720 panels) at the entrances. The 3,330 lineal feet of ceiling include 2,730 suspended and 600 directly attached panels. The installation required 202 tons of enameling iron.

Installed in 27 panel assemblies

A typical assembly of 27 panels required that each panel be attached to another and the entire assembly tied into place with a large structural T. This T member is then attached with hangers to the structural ceiling.

A special hydraulic platform was used to raise the pans into place after assembling and pouring of concrete.

This 2-lane vehicular tunnel is the

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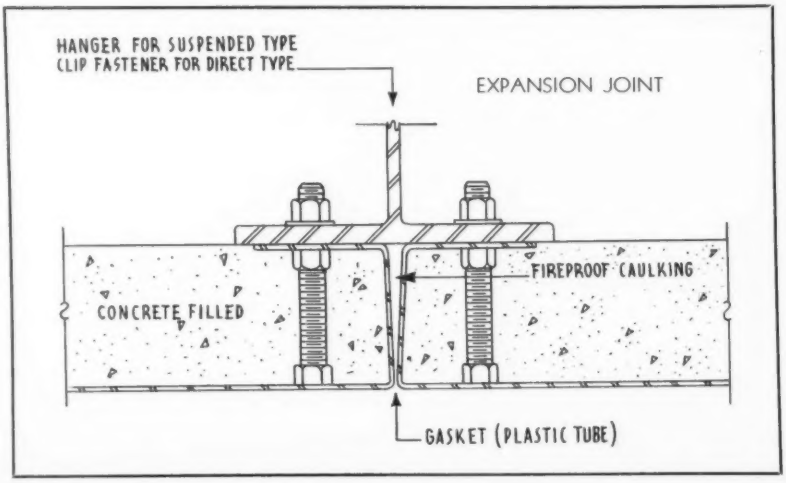

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...when she buys Something NEW

The woman . . . America's biggest retail buyer. She looks first for style and beauty but she's practical too. She knows that the finest quality porcelain enamel finish costs less in terms of service and durability.

In home, farm and industry, hundreds of products can be made more useful, more durable, more beautiful . . . and easier to sell with Pemco Porcelain Enamel finishes.

Through 41 years, Pemco's research leadership has been proved again and again. In titanium covercoats Neowite is a winner. For a one-fire brown you can't beat Pyroflex. Our ground coat frits are widely used and genuinely liked.

Pemco's engineers will be glad to work with you at any time.

Write for your copy of "How to Apply and Fire Groundcoats" by George D. Martin.

always begin with a good finish . . . for, after all, it's the finish that sells!

PEMCO CORPORATION 5601 Eastern Ave., Baltimore 24, Maryland

"The World's Finest" PORCELAIN ENAMEL FRITS • GLAZE FRITS • PORCELAIN ENAMEL COLORS • GLAZE STAINS • GLASS COLORS and CERAMIC MATERIALS

ADMIRAL TO ENTER FREEZER, ROOM COOLER FIELDS

Ross D. Siragusa, president, Admiral Corporation, has announced that his company will further diversify its production of home appliances next January with the addition of complete new lines of home freezers, room air conditioners and dehumidifiers. Admiral also produces refrigerators, ranges, television, radios and radio-phonographs.

UTILITY APPLIANCE ACQUIRES MISSION APPLIANCE

The purchase of Mission Appliance Corp., Hawthorne, Cal., by Utility Appliance Corp., Los Angeles, has been announced by Harry A. Goldman, Utility chairman and treasurer.

It was indicated that Mission Appliance and its subsidiary, Bower Electric Co., will be operated as separate companies, retaining their own identities. The management of Mission Appliance will remain unchanged "for the time being" and that firm's line of wall and floor furnaces will be expanded, stated Goldman.

CARRIER TO EXPAND ROOM COOLER PRODUCTION

Cloud Wampler, president, Carrier Corporation, has announced plans for greatly increased production of residential air conditioning equipment in 1953. Carrier is currently moving into a new plant of 400,000 sq. ft. which will be devoted primarily to the manufacture of room coolers and other unitary equipment.

The company has also arranged for the purchase of another 400,000 sq. ft. of plant space from Syracuse University for manufacturing, research, warehousing, and office use, stated Wampler.

PORCELAIN METALS UPS TURNER TO FACTORY MGR.

P. B. McBride, president, Porcelain Metals Corp., Louisville, has announced the appointment of W. D.

Turner, formerly plant superintendent, as factory manager. He also announced that C. J. Kleinhans, ceramic engineer, has been named to the newly-created position of administrative assistant to the president.

MEIER BUYS SILENT BREEZE

The purchase of Silent Breeze Ventilating Fan Division, Holcomb & Hoke Mfg. Co., by Meier Electric & Machine Co., Indianapolis, has been announced by Frank L. Meier, president.

Meier Electric will add the Silent Breeze large window and attic fans to its line of ventilating fans. Meier also manufactures electric heaters, dehumidifiers and propellers for fans.

KAWNEER NAMES FURBACHER DIRECTOR OF PURCHASES

Stephen A. Furbacher has been appointed director of purchases for The Kawneer Company, Niles, Mich., it was announced by Irving R. Seely, vice president of manufacturing. Furbacher formerly was manager of defense sales.

SCHAEFER NAMES HARGRAVE CHIEF ENGINEER

The appointment of D. A. Hargrave as chief engineer has been announced by Schaefer, Inc., Minneapolis. He was previously freezer production engineer at Deepfreeze Appliance Division of Motor Products Corp.

Hargrave will be responsible for design, tooling, and quality control on the firm's line of home freezers, commercial ice cream and frozen food cabinets.

BLUM TO MANAGE RHEEM ORDNANCE PLANT

It has been announced that H. J. Blum is now manager of Rheem Manufacturing Co.'s ordnance plant, San Pablo, Calif. He succeeds Fred Wood who was transferred to Linden, N. J., as regional manager.

STEWART TO MAYTAG; REAL NAMED GLOBE PRODUCTION MANAGER

Globe American Corp., Kokomo, Ind., has announced that Paul Stewart, production manager, will resign as of November 1, to take a new administrative position with The Maytag Company, Newton, Iowa. It was stated that his new position with Maytag will carry the responsibility

for coordinating production and allied control activities for Maytag's three plants.

Succeeding Stewart as Globe production manager will be John Real, who has recently been working for Globe in the government contracts department.

EMPIRE TO ASSEMBLE PERFECTION PRODUCTS IN CANADA

Early in 1953, Empire Stove & Furnace Co., Owen Sound, Ontario, will begin assembly operations on Perfection Stove Company products for Canadian distribution. One of the largest stove and furnace manufacturing plants in Canada, Empire Stove has been given exclusive manufacturing and distributing rights for the complete Perfection line. The Canadian company was recently purchased by Bryce, James, and Charles Moffat, pioneers in the stove business.

RCA TO ACQUIRE ESTATE STOVE FROM NOMA ELECTRIC

Noma Electric Corporation and Radio Corporation of America jointly announced that negotiations have been concluded for RCA's acquisition of The Estate Stove Company, of Hamilton, Ohio, which is now a division of Noma.

The announcement by Henri Sadacca, president of Noma, and Frank M. Folsom, president of RCA, stated that the agreement is subject to approval of Noma stockholders, whose next regular meeting is scheduled for November 5.

Estate Stove, it was pointed out, is one of the oldest manufactureres of gas and electric ranges in the industry. Estate also produces gas and oil space heaters under the nationally known trademark "Heatrola." Its acquisition, the announcement stated, will provide RCA with manufacturing facilities and an organization of skilled workers and experienced management for its entrance into the cooking and heating appliance fields.

It is planned that RCA will form a new subsidiary, RCA-Estate Appliance Company, Inc. Cecil M. Dunn, president of Estate Stove, will become president of the new subsidiary.

Cecil M. Dunn, left, president of Estate Stove Company, Hamilton, Ohio, shows features of the Estate electric range to Charles M. Odorizzi, operation vice president of RCA Victor Division, and Robert A. Seidel, RCA Victor vice president.

LOUIS UPTON DIES

Louis C. Upton, 66, chairman and founder, Whirlpool Corp., died October 9. He had been active in industry since 1912 when he organized Upton Machine Co., which merged with 1900 Washer Co. in 1929 to form 1900 Corp. The name was changed to Whirlpool Corp. in 1950.

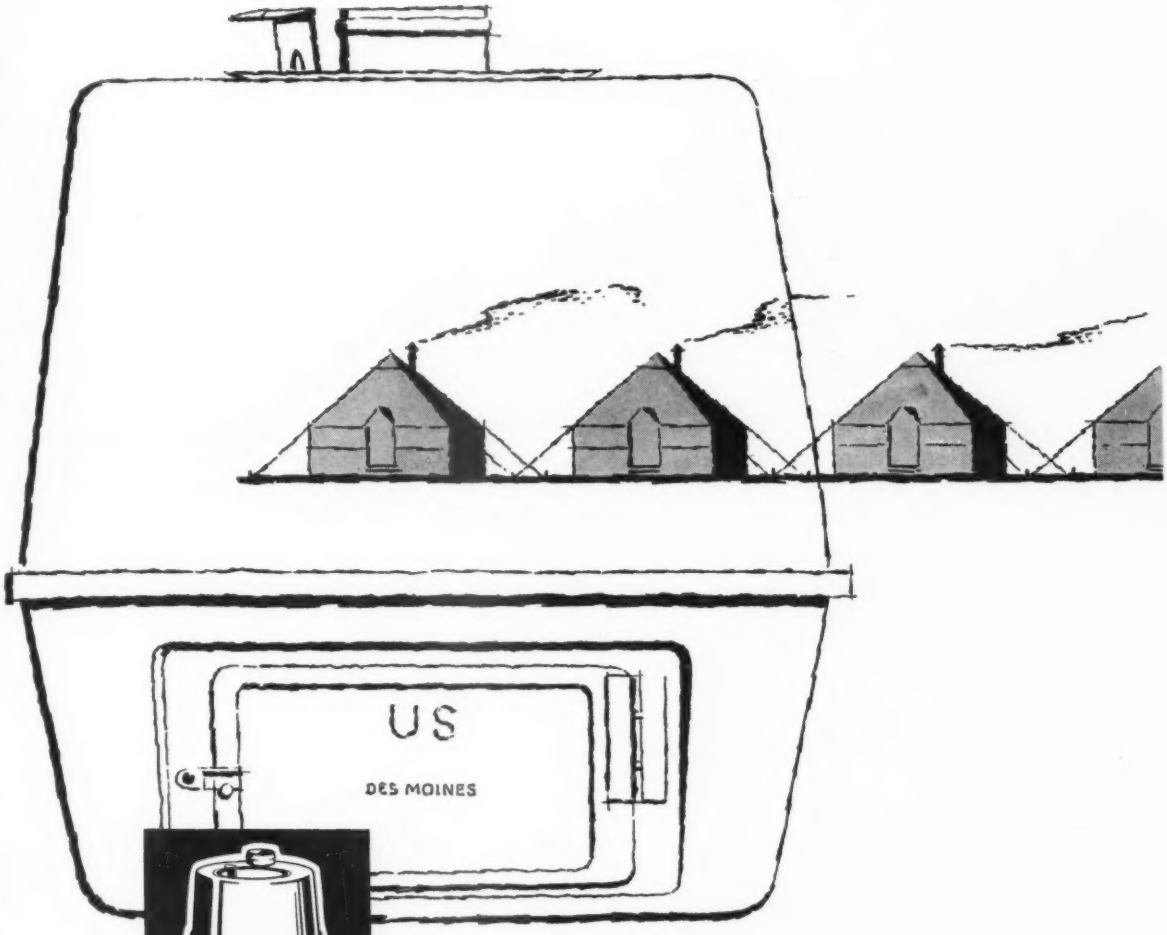
SHARP, LEHMAN ELECTED TO BOARD OF NEMA

John C. Sharp, president, Hotpoint Company, and Herman F. Lehman, general sales manager, Frigidaire Division, General Motors Corp., have been elected to the board of governors of the National Electrical Manufacturers Association.

QUIET-HEET TO EXPAND ROOM COOLER PRODUCTION

Quiet-Heet Mfg. Corp., Newark, N. J., is planning to expand production considerably on its lines of room air conditioners, it was announced by Eugene M. Peters, vice president of sales, Quiet Kool Division.

It was stated that excellent consumer demand for its line of room coolers, including a new "Install It Yourself" air conditioner, was responsible for the contemplated increased production.



GOVERNMENT CAMP STOVE CONTRACT COMPLETED BY NEW MONARCH

THERE'S AN EASY WAY TO STEP UP YOUR STAMPING PRODUCTION

If your essential civilian or defense program specifies stampings, you should consider the facilities of the New Monarch Machine and Stamping Company. With over 40 years of experience and the most modern facilities of three fully equipped plants, we are prepared to turn out for you stampings of the finest kinds—with the greatest economy consistent with superior quality.

With our Complete From-Blueprint-To-Shipping-Carton Service, we are specialists in the fields of contract manufacturing and of sub-contracting defense items. For invaluable aid in stepping up your production, take the easy way. Consult New Monarch today.

. . . For More Steel Tomorrow, Get Your Scrap Ready Today.

When in need of Stampings See...

MONARCH QUALITY

NEW MONARCH MACHINE & STAMPING CO.
406 S.W. NINTH STREET DES MOINES 9, IOWA

AGA home safety education—*resulted in the National Safety Council awarding certificate of commendation and a meritorious citation to American Gas Association. Left to right: C. George Segeler, AGA; Lee W. James, Safety Council bd. chm.; Charles E. Bennett, AGA pres.; Frank C. Smith, AGA vice pres.; H. Carl Wolf, AGA mg. dir.*

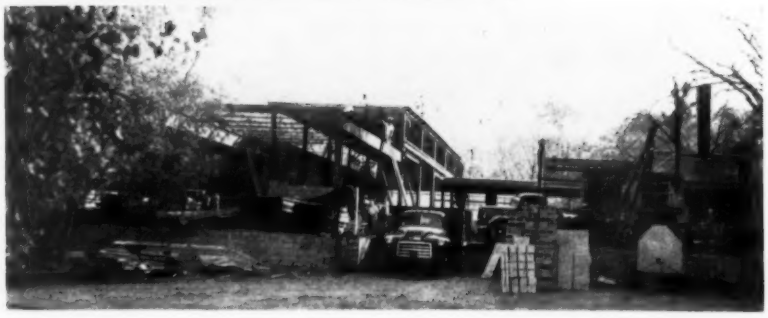
Jobbing plant in operation 5 weeks after fire destroys building

DESCRIBED *by J. W. Vicary* • PRESIDENT, ERVITE CORPORATION, ERIE, PENNSYLVANIA

VERY early the morning of August 8, in the vicinity of the shipping clerk's desk, a fire of undetermined origin started. The night furnace crew discovered the fire after it had gained some headway in the shipping room, and the fire was fought for approximately three hours by two volunteer companies in our township, utilizing eight pieces of equipment. The building was 75% destroyed, but the equipment, due to its location and the inherent nature of its construction, suffered only about 33% damage, all of which was covered by insurance. There was a considerable inadequately insured stock loss. Total loss was about $100,000, including that covered by insurance.

Left: Looking from the east of the shop inside.

Below: This photo shows the state of reconstruction four weeks after the fire.



Approximately 40 men were immediately put to work cleaning out debris and preparing the building for reconstruction. The structural work was contracted for, as was power wiring and roof coating. The balance of the reconstruction work was done by Ervite forces, and so efficient was the progress of the work that job enameling operations were resumed five weeks after the fire. Within another week (as of October 9), which will be ten weeks after the fire, all departments will be in full operation.

The building and equipment have been restored substantially in the same manner as originally constructed and installed, excepting that the plant is split in two halves by a solid masonry wall with fire door access to avoid repetition of a disastrous fire, should a fire start in any part of the plant.

Our plant produces jobbing and sign work. Customers, who could not suffer delay during rebuilding, were, in part, served by the generosity of our competitors.

CORY LEASES PLANT FOR ROOM COOLERS, DEHUMIDIFIERS

Cory Corporation, Chicago, has announced it has taken a long-term lease on a four-year-old plant in Grayslake, Ill., where it will produce its line of Fresh'nd-Aire room air conditioners and dehumidifiers. The announcement, by J. W. Alsdorf, president, said the plant contains 52,000 square feet on 14½ acres, and is located about 35 miles northwest of Chicago.

The company hopes eventually to transfer all its Fresh'nd-Aire Divi-

Here's the way to expanded enameling volume . . . increased customer satisfaction

Du Pont Vitreous Enamels for Aluminum

The trend is to vitreous enamels for aluminum. Designers and metal fabricators are learning how these new finishes offer the combined advantages of color appeal, durability and ease of fabrication . . . how they permit wider use of lightweight aluminum alloys in structural and decorative applications. A new and profitable field is opening up for the enameling industry.

Du Pont aluminum enamels can be readily and inexpensively applied by the enameler using ordinary enameling and firing procedures. Enamel slips used in the finishing process are prepared with specially adapted Du Pont frits and are based on Du Pont formulations.

Why not see how you can expand your enameling volume and increase customer satisfaction by adding aluminum enamels to your line of finishing services. We'll be happy to supply you with technical literature and give you specific recommendations on how the enameling process can best be adapted to your individual needs. For more information send the coupon below to: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Del.

IMPORTANT ADVANTAGES OF ALUMINUM ENAMELS

COLOR APPEAL—available in a wide range of colors and degrees of surface gloss.

DURABILITY—Du Pont aluminum enamels are light-fast . . . display excellent resistance to corrosion, abrasion, thermal shock, impact and flexing . . . have a high dielectric strength.

EASE OF FABRICATION—Enameled aluminum can be sheared, sawed, drilled and punched without damage to the coating. Costly prefabrication is eliminated.

INCREASED STRENGTH—A standard-thickness coating of vitreous enamel increases the rigidity of sheet aluminum as much as 60%. Lighter gauge sheets can be used—with substantial savings.

IMPORTANT APPLICATIONS

- Roofing
- Structural Siding
- Wall and Ceiling Panels
- Signs and Labels
- Furniture and Cabinets
- Tanks
- Architectural Tile
- Electrical Shielding
- Pipes and Fittings
- Appliance Parts
- Marine Applications

DU PONT
VITREOUS ENAMELS
FOR ALUMINUM

DU PONT

150th Anniversary
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department, Wilmington 98, Delaware

Please send more information on Du Pont vitreous enamels for aluminum: Properties, uses, formulations, methods of applying, etc. I am interested in enameling the following types of work _____

_____

Name _____ *Position* _____

Firm _____

Street & No. _____

City _____ *State* _____

sion's manufacturing operations to the new plant. Currently these items are manufactured at Cory's main plant in Chicago. The company now has four plants in the Chicago area, and one in Toronto, Canada.

LAUNDRY EQUIPMENT SALES RISE IN AUGUST

Factory sales of standard-size household washers in August totalled 254,537 units, up 22.6 per cent over July, and 6.5 per cent over August 1951.

Dryer sales totalled 53,376 units, up 57.6 per cent over July, and up 32.8 per cent over August 1951.

Ironer sales totalled 16,477 units, up 9.7 per cent over July, but down 4.2 per cent from August a year ago, according to figures released by the American Home Laundry Manufacturers Association.

HARDER TO EXPAND FREEZER PRODUCTION FACILITIES

Harder Refrigerator Corp., Cobleskill, N. Y., has revealed plans for the expansion of production facilities for the Harderfreez line of farm and home freezers. The announcement, made by Robert L. Tyler, president of both Harder and its parent company, Tyler Fixture Corp., came on the day that marked the silver anniversary of Tyler Fixture.

The expansion program marks the third increase in floor space since Tyler acquired Harder in 1944. Added space will consist of 16,000 sq. ft. of new manufacturing space and the construction of a new office building to free additional space for

At Harper-Wyman 25th anniversary — *left to right — Philip S. Harper, Jr., manager of company's plant in Princeton, Ill; Mrs. Philip S. Harper; Mr. Harper; and Mrs. Lamar Harper Wrisley, their daughter, on occasion of scroll presentation at celebration held at Chicago plant. The company makes gas burners, valves, and automatic lighters for gas ranges.*

FAHRALLOY Burning Tools for *your* WORK

STANDARD OR TO ORDER

Today's variable steels increase hazard of distorting flanges or marking ware. Fahralloy experience assures minimum bearing area and proper suspension of your product. Less rejects, longest service life, lowest per-hour service cost are yours through Fahralloy research, with elimination of non-essential weight, and positive endurance under thermal stress.

Negligible weight loss in long use of Fahralloy Grade F-5 (65% nickel, 20% chromium). Minimum warpage and breakage. Fahralloy Grade F-1 (35% nickel, 15% chromium) used in many applications.

Send for Burning Tool Catalog 48

THE FAHRALLOY COMPANY

150th and Lexington Avenue HARVEY, ILLINOIS

A Hotpoint dishwasher — *with glass window as a demonstration device in sales promotion work — is viewed by Lee J. DiAngelo, left, sales promotion manager, and Howard J. Scaife, sales manager, Hotpoint Company.*

production. The move will allow more space in the sheet metal department for the installation of large hydraulic presses for the forming of cabinet parts. Movement of the metal department into the new area will allow for an expansion and relocation of the welding department, and the space presently occupied by offices will be added to a newly-equipped finishing department which will be equipped with the latest metal cleaning and finishing equipment.

Importance of water control in enameling

→ *from Page 31*

In summary, it is very difficult for us to pinpoint the advantages derived from the water control equipment. Our water supply, furnished to us by the City of Chicago from Lake Michigan, is relatively good, and therefore our advantages have been definitely of a general nature.

Some of our positive gains have been (1) lower scrap, (2) lower rework—through better application control and by fewer enamel imperfections, (3) more single coat ware, (4) higher quality ware, and (5) lower overall operating costs.

Elizabeth River Tunnel

→ *from Page 59*

unusual trench type. Steel casings for the underwater portion were prefabricated on shipways ashore. Bulkheaded at both ends and launched shipwise, they were fitted with interior rings of concrete and roadway slabs; then sunk and locked into position in a trench dredged across the river bottom.

The tunnel trench is about 50 feet deep and 40 feet wide at its lowest point. Here the tunnel is 95 feet below the river surface at mean low point.

Engineers for the job were Parsons, Brinckerhoff, Hall & McDonald.

Contractors were Merritt-Chapman and Scott.

Fabricators, enamelers and erectors were Seaporcel Metals, Inc.

for Clarification of

NICKEL DIP SOLUTIONS
NEUTRALIZING SOLUTIONS

Any Quantity

use an INDUSTRIAL Filter

100 to 15,000 gallons per hour. Portable and stationary models. Standard or special filtration systems engineered to meet unusual requirements.

Dependable clarification pays . . .

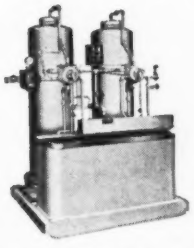
Here's how Industrial filters simplify clarification problems—The flow rates of Industrial filters are based on the actual solution involved. You know the capacity you get. In solution clarification there is more than just the filter. With Industrial you get an adequate filter with slurry tank, motor-driven pump, valves and fittings in a complete package with one, undivided, experienced responsibility—with space requirements at a minimum.

The labor, down time, and the inconveniences of cleaning, replacing the filter media, and reassembling the filter for every new filter cycle—all are eliminated by the Industrial Air-Wash Cleaning Method available for all models. It is necessary to remove the cover only when new filter cloths are installed. With Industrial filters, a clarified plating solution is always assured.

The engineering, design, and construction of Industrial filters have proved out in long service and low maintenance costs. Industrial has the experience and is large enough to handle your filter requirements. Since 1927 filters and filtration systems have been an important part of our business.

INDUSTRIAL Water Demineralizers

for Mill room assurance that the slip is always right



A Two-Bed INDUSTRIAL Water Demineralizer. Standard two-and four-bed units available with capacities of 200 to 1000 gph. Special units of any capacity engineered to requirements.

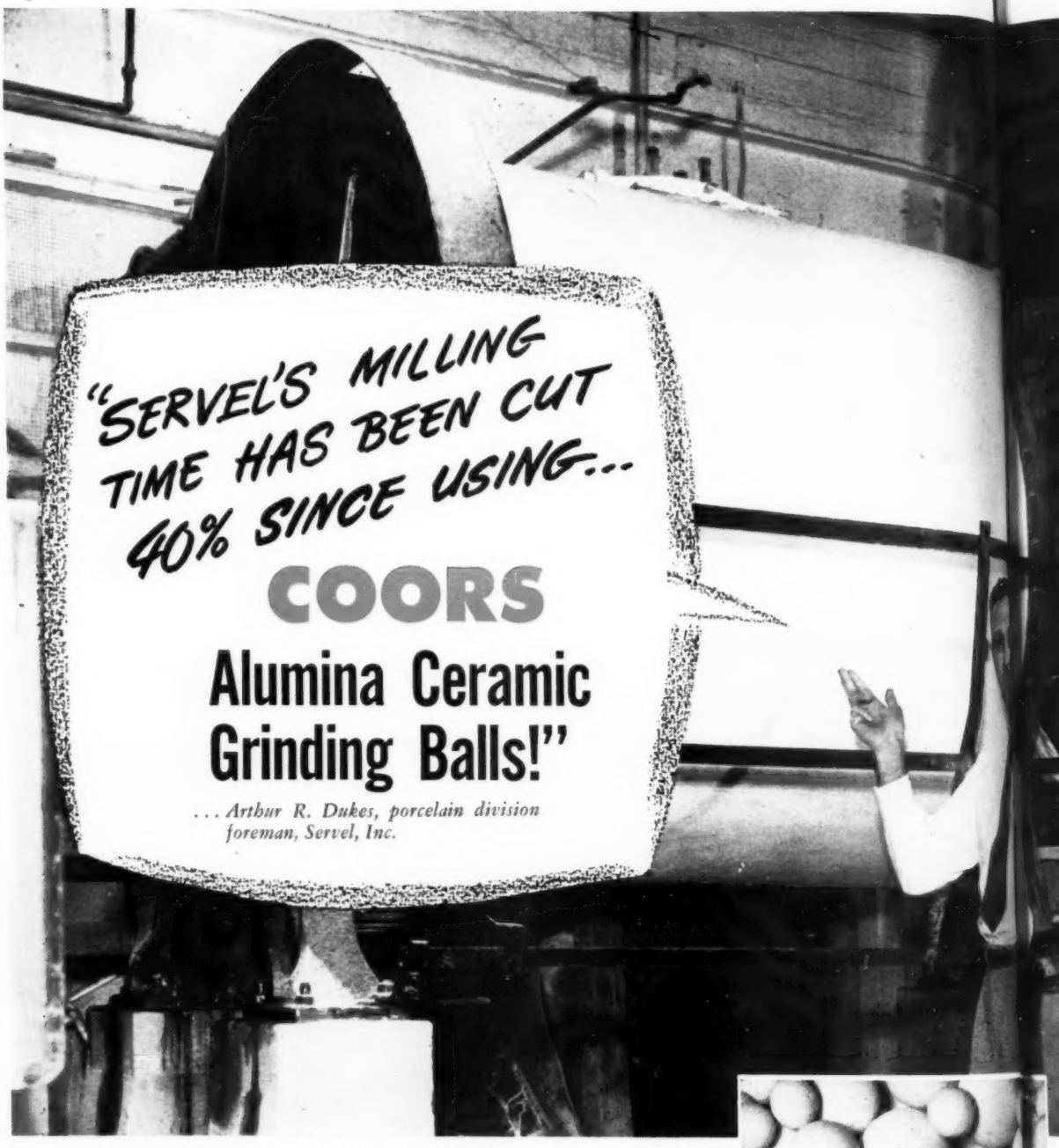
Write for full information and recommendations

FILTERS Pressure Type · PUMPS Centrifugal · CORROSION TESTING APPARATUS Salt Fog • Humidity

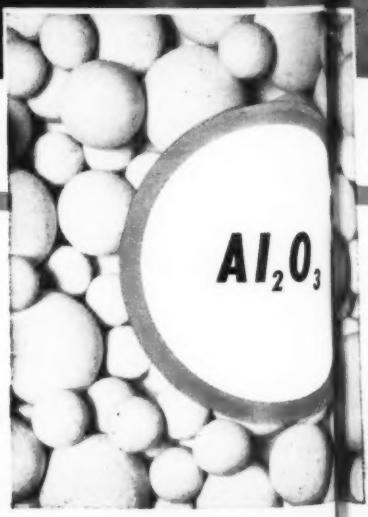
INDUSTRIAL FILTER & PUMP MFG. CO.

5906 Ogden Avenue
Chicago 50, Illinois

RUBBER DIVISION Vulcanized Linings • Molded Products · WATER DEMINERALIZERS


"SERVEL'S MILLING TIME HAS BEEN CUT 40% SINCE USING...
COORS
Alumina Ceramic Grinding Balls!"
... Arthur R. Dukes, porcelain division foreman, Servel, Inc.

Arthur R. Dukes is pictured above standing beside a mill in the Servel plant where milling time was cut 40% by using COORS Alumina Ceramic Grinding Balls for milling ground coat and finish enamels.



By Test the Best!

- High Density—Faster Grind
- Tough Ceramic—Minimum Wear
- Pure White—No Color Contamination
- Smooth Surfaces—Easy Cleaning
- High Strength—No Chipping or Cracking

SERVEL, INC., Says:

"We average 40 to 45% less mill time using COORS Alumina Ceramic Grinding Balls. With COORS grinding balls, we get a batch with approximately 5,000 mill revolutions, as compared to an average of 11,000 revolutions with previously used balls.

"Since using COORS grinding balls, we do not have to wash the mills. It took about one-half hour washing time per batch when we used a different grinding ball.

"Servel started using COORS high-density grinding balls in July, 1950. And after more than a year, we have not added any more balls to the mills. With previously used grinding balls, it took seven balls per batch to a 1,000 pound mill.

"We now use COORS Alumina Ceramic Grinding Balls in a 2,300 pound mill, a 2,200 pound mill and a 1,000 pound mill."

Write your COORS representative, today! See how you can cut milling time as Servel, Inc. has done.

CHEMICAL AND SCIENTIFIC PORCELAIN WARE
COORS U.S.A.
Internationally Recognized for Quality

COORS PORCELAIN COMPANY
GOLDEN, COLORADO

National Sales Representatives . . .
Landes, Zachary and Peterson, 2500 West 7th Ave., Denver 9, Colorado

Sole agent for the Enameling Industry . . .
East of the Rocky Mountains, Chicago Vitreous Enamel Product Co., 1427 South 55th Court, Cicero 50, Illinois

West Coast Sales Representative . . .
Melvin L. Jontz Company, 5028 Alhambra Ave., Los Angeles 32, California

Briggs Beautyware softball team — *won the World Champion softball title in Bridgeport, Conn., defeating Miami, 2-1, in the Amateur Softball Association tournament. Earlier, the Briggs Beautyware Plumbing Fixture team won the National Industrial Championship.*

"THE INTERNATIONAL ENAMELIST" IN ITS SECOND YEAR

Ferro Corporation magazine, published by Dana Chase Publications, for foreign distribution only

The International Enamelist is the name of a technical trade publication published by Dana Chase Publications for distribution by Ferro Corporation through its foreign subsidiaries throughout the world.

The publication, now in its second year, is "dedicated to the dissemination of such technical information as will contribute most effectively to the promotion of porcelain enameling technology." Editorial content is confined almost exclusively to technical and practical subjects pertaining to porcelain enameling and ceramic finishing.

HUNTER FAN BUYS PYR-O-TUBE HEATER FROM SWANSON TOOL

Hunter Fan & Ventilating Co., Memphis, has purchased the manufacturing and sales rights to the Pyr-O-Tube heater from Swanson Tool & Machine Products, Inc., Erie, Pa.

FRIGIDAIRE OPENS $11 MILLION PLANT NEAR TORONTO

An $11 million plant of Frigidaire Company of Canada was opened October 16 near Toronto. Located on 86 acres of land, the plant already has more than 2000 employees.

EASTERN ENAMELERS TO MEET IN PHILADELPHIA, NOV. 8

At a luncheon meeting of the Eastern Enamelers Club, November 8, R. C. Meyers, of U. S. Steel Corp., will discuss "The Future and Trends in Porcelain Enamels.", and M. B.

NAGEL-CHASE V-BELT PULLEYS

for AUTOMATIC WASHERS and DRYERS

For a better pulley that offers production economy as well, specify Nagel-Chase V Belt Pulleys for your automatic washers and dryers.

Made by specialists in pulley and caster manufacture, they are precision-built from welded pressed steel for long trouble free service with minimum belt wear. The solid steel hub is designed so that the pulley cannot come loose.

Nagel-Chase V-Belt Pulleys are made in several styles, with or without bushings and as stepdown pulleys with the smaller pulley turned into the hub or integral with the larger. They may be supplied unfinished or with a long lasting aluminum lacquer finish.

Whatever your pulley requirements — consult Nagel-Chase first — it will pay you!

THE NAGEL • CHASE MANUFACTURING COMPANY
2811 N. Ashland Avenue, Chicago 13, Ill.
SPECIALISTS IN CASTERS AND PULLEYS FOR NEARLY A QUARTER CENTURY!

ALSO MANUFACTURERS OF NAGEL-CHASE WASHING MACHINE CASTERS

Gibbs, of Inland Steel Co., will discuss "The Properties of Iron and Steel for Enameling". The meeting will be held at the Sylvania Hotel, Philadelphia.

THOR ENTERS FREEZER FIELD, APPOINTS STELTENKAMP

Thor Corporation, Chicago, has revealed that it plans to produce a line of home freezers in the near future. C. R. Steltenkamp has been named manager of refrigeration products.

MUNTZ BUYS CHICAGO AREA PLANT FOR ROOM COOLERS

Muntz TV, Inc. has announced the acquisition of 45,000 square feet of production facilities in Evanston, Ill., where complete manufacture and assembly of a line of room air conditioners. It was also announced that Earl W. Muntz has resigned as president of Muntz Car Co., in order to devote his time to Muntz TV and its new line of room coolers.

HAFENDORFER NAMED V.P. OF CHI VIT BUILDING DIV.

Chicago Vitreous Enamel Product Co., Cicero, Ill., has announced the election of A. J. Hafendorfer as vice president of their steel building division.

BENNETT CHAPPLE JR. TO NPA METALS AND MINERALS BUREAU

Appointment of Bennett S. Chapple, Jr., assistant executive vice president, commercial, United States Steel Co., as assistant administrator of the National Production Authority in charge of Metals and Minerals Bureau, was announced by Richard A. McDonald, NPA administrator.

TAYLOR NOMINATED FOR PRES. OF HEATING, VENTILATING ENGRS.

The American Society of Heating and Ventilating Engineers has announced the nomination of R. F. Taylor, Houston consulting engineer, for president of the Society in 1953.

DEVILBISS REPORTS SUCCESSFUL WEST COAST SPRAYING SCHOOL

More than 150 spray finishing men attended the eight classes on spray finishing conducted at the University of Santa Clara, with laboratory periods held at The DeVilbiss Company's plant in Santa Clara, Calif.

George I. Stoddard, of DeVilbiss, who conducted the classes, said the course aroused considerable interest, with several students already having written in since outlining plans for spray finishing apprentice training programs begun at their companies.

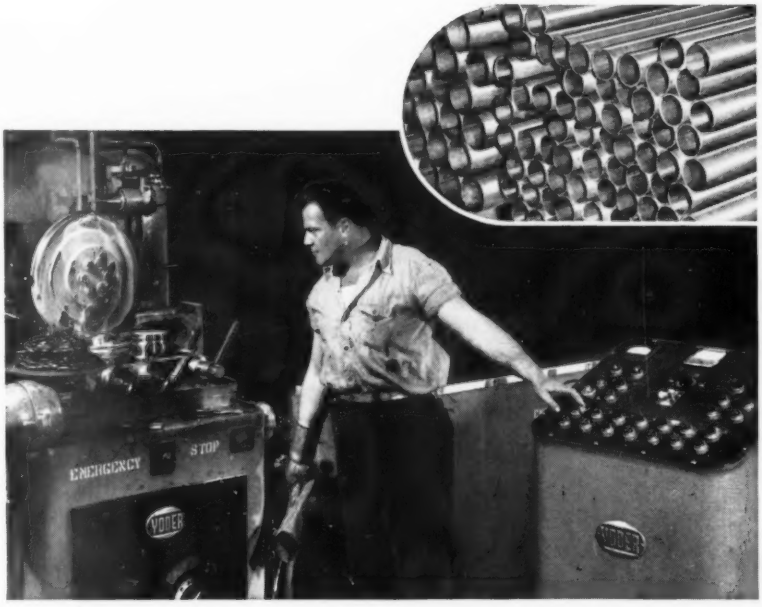
WESTINGHOUSE UPS APPLIANCE PRODUCTION 25 PER CENT

Westinghouse Electric Appliance Division, Mansfield, Ohio, will increase production by 25 per cent or better before the end of this year, it was reported by J. H. Ashbaugh, vice president.

Employment at the Mansfield plant will reach in excess of 7500 by December 1, company executives reported as they started to swing production into high gear. Hiring of new employees began as the appliance plant began the building up of dwindling inventories of refrigerators, ranges, automatic washing machines, clothes dryers, steam irons, and other electric housewares.

ROGER L. FELLOWS JOINS CENTURY VIT

Announcement comes to *finish* that



Thinking of making **PIPE OR TUBING?**

In 1938, total U. S. A. production of electric-weld pipe and tubing was only 269,000 tons. But in that year, Yoder brought out a line of cold-roll-forming tube mills, equipped with their revolutionary new electric-resistance welder.

According to the latest available figures, U. S. A. production of electric welded pipe and tubing in 1950 was nearly 3,500,000 tons, a growth of 1300% in 12 short years.

Much of this growth was due to the advantages of the cold-forming, electric-weld process in general, and to the excellence of Yoder Tube mills in particular, because most such mills installed since 1938 have been built by Yoder.

With the new multiple cross-type welding transformer and other recent Yoder developments, Yoder mills now offer higher speeds and greater economy than ever. If you have been thinking of making pipe or tubing, get the latest information on Yoder mills—yours for the asking.

THE YODER COMPANY • 5559 Walworth Ave., Cleveland 2, Ohio

Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS—cold forming and welding

ENGINEERING YODER MANUFACTURING

Roger L. Fellows has resigned his position as assistant director of research at Chicago Vitreous Enamel Product Company to take an important position with Century Vitreous Enamel Company.

Fellows has been with Chicago Vitreous for 28 years. He is a graduate of the University of Illinois, with a B.S. degree in Ceramic Engineering; a Fellow of the American Ceramic Society, past-chairman of the Enamel Division and a trustee from 1943-46; a member of Sigma Xi; and author of numerous technical papers on porcelain enameling and allied subjects. For the past two years he has been chairman of the Porcelain Enamel Institute Shop Practice Forum Committee, and is a member of the Quality Development Committee of the PEI.

NEW ADDRESS FOR LANDES, ZACHARY & PETERSON

Report comes from B. D. Landes, manager, Ceramic Division, Landes, Zachary and Peterson, Denver, Colorado, of a new address for the firm. LZ&P are national sales representatives for Coors ceramic grinding balls for porcelain enamels and industrial finishes. According to the report, the following new address became effective October 15: 2500 W. 7th Avenue, Denver 4, Colorado, Telephone: Main 6203.

ASTM NAMES R. J. PAINTER EXECUTIVE SECRETARY

The American Society for Testing Material has announced the election of Robert J. Painter as executive secretary, to succeed the late C. L. Warwick. Painter had been treasurer and assistant-secretary.

PHILCO MAN TO SPEAK AT TEMPLE MGMT. CONFERENCE

Raymond Senderup, supervisor of quality control, Philco Corporation, is scheduled to discuss "The Roll of

High Temperature Coatings Panel: *E. F. McDonald, Ing-Rich; Hyman Leggett, California Metal Enameling; R. L. Paris, Wright Field; J. H. Terry, Hotpoint; F. D. Shaw, Bettinger; and D. G. Bennett, U. of Illinois, chairman.*

Alkali Resistance Panel: *C. H. Fuchs, Westinghouse; G. B. Hughes, General Electric; Clyde Hayward, Lever Brothers; and G. V. Stanley, Crane.*

PEI FORUM

FINISHFOTOS

Control Practice Panel: *John D. Thompson, Briggs; R. J. Baker, Frigidaire; W. A. Deringer, A. O. Smith, panel leader; C. R. Sims, Estate; M. E. Pingel, Westinghouse; M. H. Whitehead, Canton Stamping; Walter Mickey, Barrows; and George Warren, PEI Fellow at Nat'l Bur. of Stds., chairman.*

Board of Experts Panel: *J. M. Zander, Chicago Vit; L. Ashby, U.S. Stamping; J. A. Boyd, Van Straaten Chemical; W. J. Plankenhorn, U. of I.; G. W. McGohan, Armco; Marcel Pouilly, DeVilbiss; L. C. Farrow, Clyde Porcelain; Paul Schloffman, Temco; M. J. Bozsin, Ferro; R. M. King, Ohio State U.; and A. J. Holloway, Lawndale Enameling.*

a good start for a perfect finish . . .

Dependable ING-RICH FRIT

● When most porcelain finished pieces come out perfect, one after another, day after day, you can be sure of one thing—enameling on that job started with frit that was *right* for the work it had to do. Ing-Rich has been making that kind of frit for more than a half-century.

The big advantage you get in Ing-Rich Frit is that it is made by people who work every day at the business of production enameling just like you do. Here at Ing-Rich we operate our own busy job enameling plant and use frit just as you use it—all day, every day.

After 51 years of successful operation, we know pretty well what frit must have to produce good enameling results . . . and how to formulate frit with characteristics which will do it. This shirt sleeve experience pays off in performance that puts profit dollars in the bank.

If your enameling shop is getting too many rejects and workovers . . . if you're not happy about the quality of your finishes . . . talking with an Ing-Rich engineer might be the most profitable way you could spend the next convenient afternoon. Your request will bring him promptly and without obligating you in any way.

INGRAM-RICHARDSON, INC.
OFFICES, LABORATORY AND PLANT
FRANKFORT, INDIANA

ING-RICH
PORCELFRIT
"The Plant Tested Frit"

the Supervisor in Quality Control" at the 2nd annual Industrial Management and Supervisory Conference sponsored by Temple University. The conference will be held October 31 and November 1 in Atlantic City.

PERMUTIT ENGINEERING APPT.

The Permutit Company, New York City, has announced the addition of Felix W. Saco to its mechanical engineering department. He has been assigned to work on the design of all applications of ion exchange materials and techniques in the treatment of water and other liquids.

SUB-ZERO FREEZER TO DOUBLE PRODUCTION

Present plans of Sub-Zero Freezer Co., Inc., Madison, Wisc., call for an expansion program designed to double present production. The program will include an additional building to house the increased production facilities. Part of the program is already under way, and the remainder will be completed during the next year and one-half, the report stated.

ING-RICH ADDS NEW OFFICE AND WAREHOUSE SPACE

Officials of Ingram-Richardson, Inc., Frankfort, Indiana, have announced the construction of a limestone-faced addition to the company's general offices. This addition will house additional office space sorely needed and will increase space to the cafeteria which they operate in the basement, the report says.

The company is also starting the construction of an additional warehouse building 80 feet wide and 220 feet long, which will add 17,600 sq. feet of floor space in which Ing-Rich plans to store sink tops and bathtubs before shipment. The floors will be of cement and walls and roof of corrugated asbestos composition. The building will contain ramps for loading and unloading trucks and also loading and unloading railroad cars.

SHELL CHEMICAL UPS HULDRUM AND IRVINE

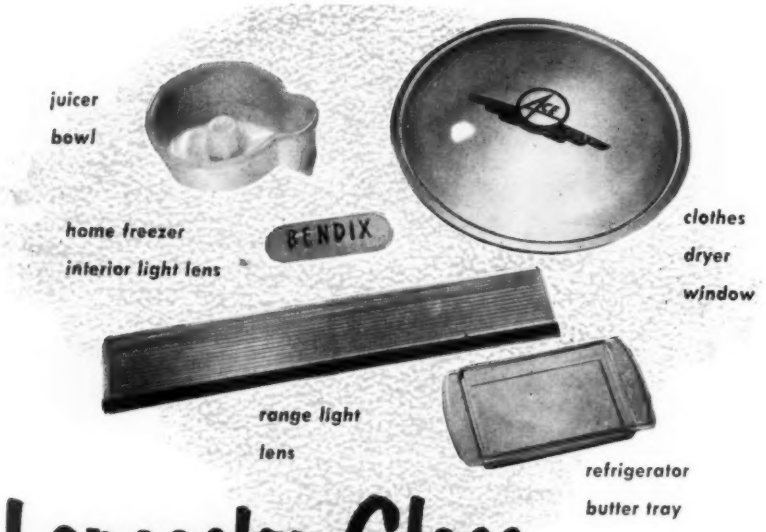
J. Oostermeyer, president, Shell Chemical Corp., has announced the appointments of G. W. Huldrum, Jr. as eastern division sales manager, and V. C. Irvine as western division sales manager.

In his new position, Huldrum will supervise all sales activities east of the Rocky Mountains for Shell's solvents, resins and plastics, and industrial chemicals. Irvine will head sales activities for similar products west of the Rockies.

U. OF ILLINOIS APPTS. IN CERAMIC ENGINEERING

The appointment of new members of the staff and fellows in the Department of Ceramic Engineering, University of Illinois, were announced recently.

James A. Nelson, formerly research associate, was appointed an instructor in ceramic engineering.



Lancaster Glass

adds that vital sales appeal!

Lancaster glass parts will give your appliance the sparkle and utility which lead to more sales. Lancaster glass means *quality*. And it boosts appliance sales appeal in two ways. First — through more attractive appearance; second — through increased utility. In other words, Lancaster glass helps sell your appliance in the showroom — and then continues selling in the home.

The piece you need for that extra selling punch may be a window for a clothes dryer . . . a lens for a freezer light . . . a special refrigerator dish . . . visual controls, dials, or top-of-stove lighting for ranges . . . an emblem or trademark . . . or any other glass part for a home appliance. All add beauty . . . make the housewife's work a little easier, a little simpler.

Contact us today. We'll be glad to design *any* glass part for you . . . to your exact specifications.

THE *Lancaster Lens* COMPANY
Lancaster, Ohio

industrial glass made to your specifications

Ralph G. Kraft was appointed a fellow on the Edward Orton Jr. Ceramic Fellowship. John Schultz, Jr. was appointed fellow on the Chicago Vitreous Enamel Product Co. fellowship.

John Cox was reappointed to the Lakefield Nepheline Syenite Fellowship. Irvin J. McKeand was reappointed fellow on the Titanium Alloy Division of National Lead Company Fellowship. Chi Fang Tung was appointed a half-time assistant in the Department.

NASH-KELVINATOR BUYS ALTORFER BROTHERS

Nash-Kelvinator Corporation has purchased the controlling interest in Altorfer Bros. Company, manufacturers of ABC laundry equipment.

The announcement was made jointly by George W. Mason, president and chairman of Nash-Kelvinator, and A. W. Altorfer, president of the 43-years-old Peoria, Illinois, firm.

"For a number of years, we have planned to expand our product lines to better serve the public by the addition of laundry equipment, deferring the step only until we could add one of the top lines in the field," Mason declared. "We are very happy now to be able to augment Kelvinator's already broad line through the acquisition of the Altorfer company."

The Altorfer company was founded in 1909 in Roanoke, Illinois, as a partnership of Henry Altorfer and his sons. The present corporation was organized in 1916, and the orginal Peoria plant built in 1918. Kelvinator's first electric refrigerator experiments began in Detroit in 1914, and the Kelvinator company incorporated in 1916. Kelvinator and Nash Motors were merged in 1937 to form Nash-Kelvinator Corporation.

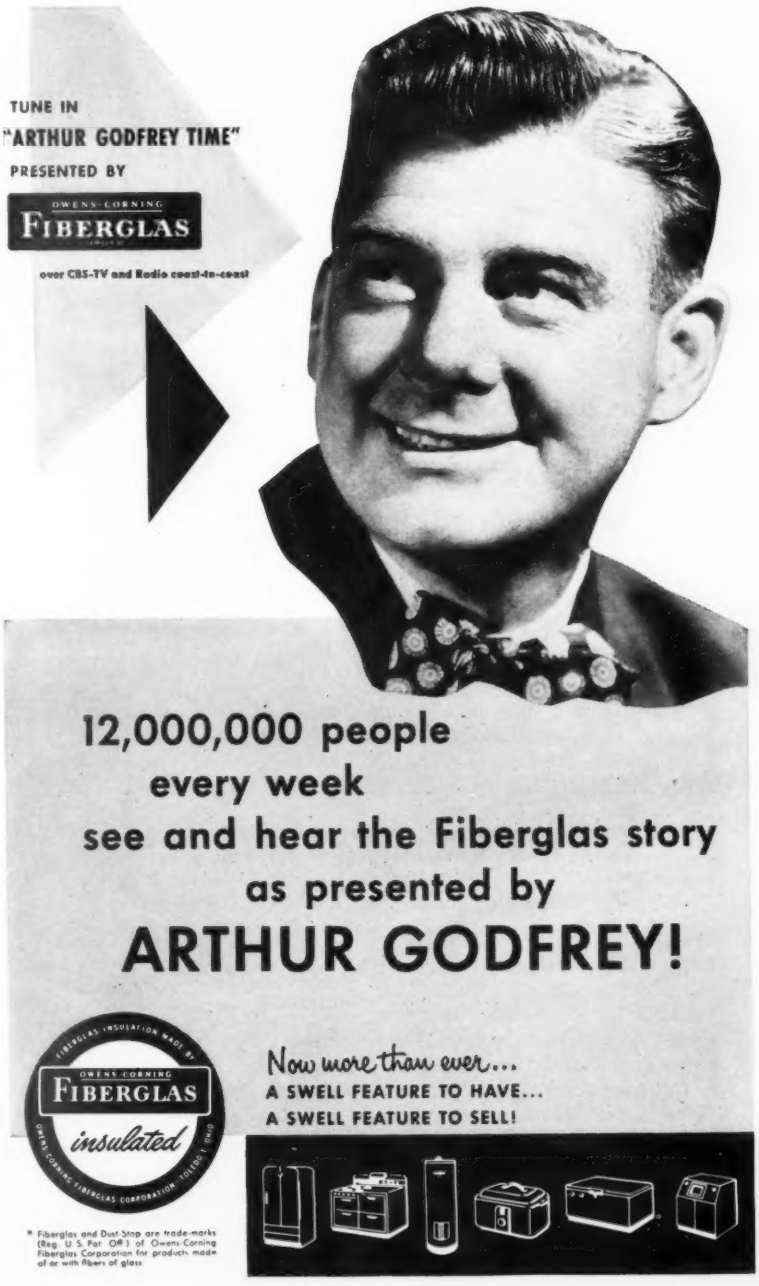
While plans have not been completed, Mason said present intention is to operate the Altorfer Bros. Company as a subsidiary under its present management. Present plans call for the continuation of the ABC line produced in the Peoria plant and a new line of Kelvinator laundry equipment.

Mr. Mason and Mr. Altorfer stated, "In the interest of better service to the American public, the resources of the Kelvinator and the ABC national organizations will ze utilized to build a stronger dealer organization in the laundry equipment field, than could be built by either company alone."

Products include automatic washing machines, ironers, conventional washers and an automatic drier that is expected to go into production soon.

HOOVER NAMED RANCO PRES.

Arthur M. Hoover has been elected president of Ranco, Inc., to succeed E. C. Raney who is now chairman of the board. Hoover has served as a top executive since becoming vice



president in 1935. The Columbus, Ohio, firm is one of the world's largest manufacturers of refrigeration controls.

WESTINGHOUSE TO EXPAND AIR CONDITIONING EQUIPMENT MFG.

Westinghouse Electric Corp. has announced plans for a $1,250,000 expansion of manufacturing operations at its Sturtevant Division plant in Hyde Park, Mass. The plant manufactures air conditioning equipment, commercial fans, and blowers. Total employment at the plant will reach an estimated 2200 persons when the new facilities are fully manned.

PRIZER-PAINTER PURCHASES ANDES RANGE LINE

L. E. Bilger, president, The Prizer-Painter Stove Works, Inc., Reading, Pa., has announced the purchase of the complete line of gas ranges, bungalow and combination ranges of Andes Range & Furnace Corp., Geneva, N.Y.

The purchase included the exclusive right to the Andes trade name, and all inventory of purchased and manufactured parts. "We are proceeding to move this merchandise and will start production as soon as it can be set up on the gas and bungalow line of ranges," stated Bilger.

It was indicated that Fred Manss, vice president and sales manager of Andes Range, has joined the Prizer-Painter sales department.

A single-pole, slow make-and-break thermostat with high sensitivity, yet rugged construction, that has wide application for heating needs up to a maximum temperature range of 550°F.

MODEL B-10 DIRECT ACTING TYPE. *Breaks* circuit on rise of temperature. Particularly suitable for sterilizers, steam tables, warming tables, ovens, coffee urns, deep-fat fryers, baby incubators, poultry brooders, etc.

MODEL B-20 REVERSE ACTING TYPE. *Makes* circuit on rise of temperature. Particularly suitable for warning lights or signals on over-temperature for application to fire signals, signal overheating, motor generators, etc. *Write for full information.*

In Home and Industry *EVERYTHING'S UNDER CONTROL*

Robertshaw® THERMOSTAT DIVISION

ROBERTSHAW-FULTON CONTROLS COMPANY • YOUNGWOOD, PENNSYLVANIA

SEAPORCEL METALS PRES. ON EUROPEAN TOUR

M. Jesse Salton, president, Seaporcel Metals, Inc., Long Island City, N.Y., is on a two-and-one-half-month tour of Europe, and will spend considerable time in Paris with the Department of Construction of the French Navy.

French naval experts are reported to have expressed strong interest in the porcelain enameled muffler, piping, bulkheading and other products of Seaporcel which have been installed on American naval, military and commercial vessels.

CHRISTENSEN HEADS INDUS. MINERAL FIBER INSTITUTE

Frank Christenson, Refractory & Insulation Corp., New York, has been elected president and chairman of the board of the Industrial Mineral Fiber Institute (formerly the Industrial Mineral Wool Institute) at its 11th annual meeting in Melvin Village, N.H. He had been president of the Institute.

Other new Institute officers include J. S. Blunt, Holmes Foundry Co., Ltd., Sarnia, Canada, vice president, and W. M. Ehrlich, M. H. Detrick Co., Aurora, Ill., treasurer.

New directors include: David Barthold, Owens-Corning Fiberglas Corp.; G. J. Christner, The Eagle-Picher Sales Co.; E. R. Stevens, Baldwin-Hill Co.; and N. L. Morell, of N. L. Morell.

STONER MFG. GETS ARMY CARTRIDGE CASE CONTRACT

Stoner Manufacturing Co., Aurora, Ill., has received a $1,093,436 contract for making brass cartridge cases. The announcement was made by the Chicago Ordnance District of the Army.

OLSEN HEADS U. S. S. SUPPLY MARKET DEVELOPMENT DIV.

Canute R. Olsen has been appointed manager of the market development division and Linus E. Olson manager of the inventory control division in the sales department of United States Steel Supply Division, it was announced by Keith P. Rindfleisch, division sales vice president.

SHERWIN-WILLIAMS INDUSTRIAL FINISH REPS GO TO SCHOOL

Sixty industrial finishes representatives of The Sherwin-Williams Company went back to school in September, attending a special "new developments" course at the company's Chicago laboratories. The men, drawn from all parts of the country, were given intensive practical training on the latest finishes and finishing techniques Sherwin-Williams has developed.

Laboratory staff members, headed by H. E. Spitzer, laboratory director, conducted the meetings. During the two-week session the representatives were given a close-up view of typical problems faced by industrial finish users and learned practical solutions to those problems. Also included in the curriculum were seminars devoted to new trends in industrial finish requirements, and laboratory meetings in which the men prepared and applied finishes to various type of surfaces.

The service-to-customer field was also discussed during the course. L. M. Muse, of the Sherwin-Williams General Industrial Division, in Cleveland, counducted these meetings. The entire program, according to Muse, was aimed at equipping the representatives with the latest information in the rapidly expanding industrial finishing field.

"THE DETROIT CONTROLS CORP."

In order to more accurately describe its present products, the board of directors of Detroit Lubricator Co. have announced that hereafter the company will be known as The Detroit Controls Corp.

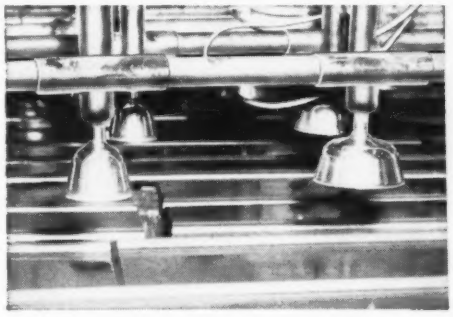
There will be no change in operating personnel and the company will continue as a division of American Radiator & Standard Sanitary Corp. The company manufacturers automatic controls for refrigeration, air conditioning and heating equipment.

1951 STEEL BOILERS SALES

A total of 110,831 steel boilers were sold in 1951, according to the Plumbing and Heating Industries Bureau. Of this number, 84,860 were of the residential type.

PRODUCTION AND PAINT MILEAGE STEPPED UP 60% WITH THE

Ransburg NO. 2 PROCESS



Butler Manufacturing Company—in its Galesburg, Ill. plant—uses the Ransburg No. 2 Electrostatic Process for spray painting big sheets of roofing and siding for steel utility buildings. Average paint production runs 15,000 square feet per hour.

On this installation, production was increased 60% and paint mileage was stepped up 60% over the former hand spray operation. Coverage uniformity was greatly improved and this unit, with one operator, handles a production volume equivalent to work done by 7 hand spray men.

This is another of the many applications where the Ransburg No. 2 Process is effecting new efficiencies—saving time, labor and materials—with consistently higher quality results.

If your production volume justifies conveyorized painting, you should investigate the savings to be effected through use of the Ransburg No. 2 Process. Write for our brochure, describing the No. 2 Process.

Electrostatic Painting Processes

RANSBURG ELECTRO-COATING CORP.
Indianapolis 7, Indiana
RANSBURG

Problems and equipment in spot welding

(Continued from page 23)

In spite of the reports that these machines have been improved in the matter of electrode life and pick-up, we find that there is still need for further work in this field. Probably the complete solution of this problem, in the case of aluminum alloys, will come only when shorter weld times are possible.

Sensitivity to power variation is a typical phenomenon related to direct demand equipment and is held within acceptable limits by proper engineering of the power supply to meet machine characteristics.

Our largest frequency-converter machines have a throat depth of 60 inches and a 62-inch working height. They were designed with the objective of building the external fuel tank in mind. This huge fuel container is formed into a smooth cell with spot and seam welded joints without the use of rivets or sealing compounds. 30,000 spot welds are used in its exterior skins. The big spot and seam welding machines have proved eminently satisfactory in the tough assignment of fabricating large quantities of these structures without rejection.

Three-phase electrostatic stored-energy machines

The electrostatic, stored-energy type equipment is a popular performer. We have spot, seam, and roll-spot machines which are accomplishing excellent work. The limitations on this equipment are restricted speed for seam welding and confinement to use with aluminum and magnesium alloys because of wave shape. Of course, special crosswire, projection, and similar applications of welding with other materials can be accomplished, but these are not classified as structural aricraft jobs.

The advantages of these machines are numerous. They are insensitive to power variation, possess long tip life, perform with minimum distortion, and provide excellent duplication of specified results.

A striking example of the type of work which these machines perform is on the large floor beam built for Boeing C-97 Stratofreighters. 1,000 spot welds are placed in each of these light-weight structures to form an I-beam assembly which is part of the structural floor of the Stratofreighter. Forty-nine of these beams go into each C-97, which can transport 68,000 pounds of freight.

Three-phase, dry-disc rectified machines

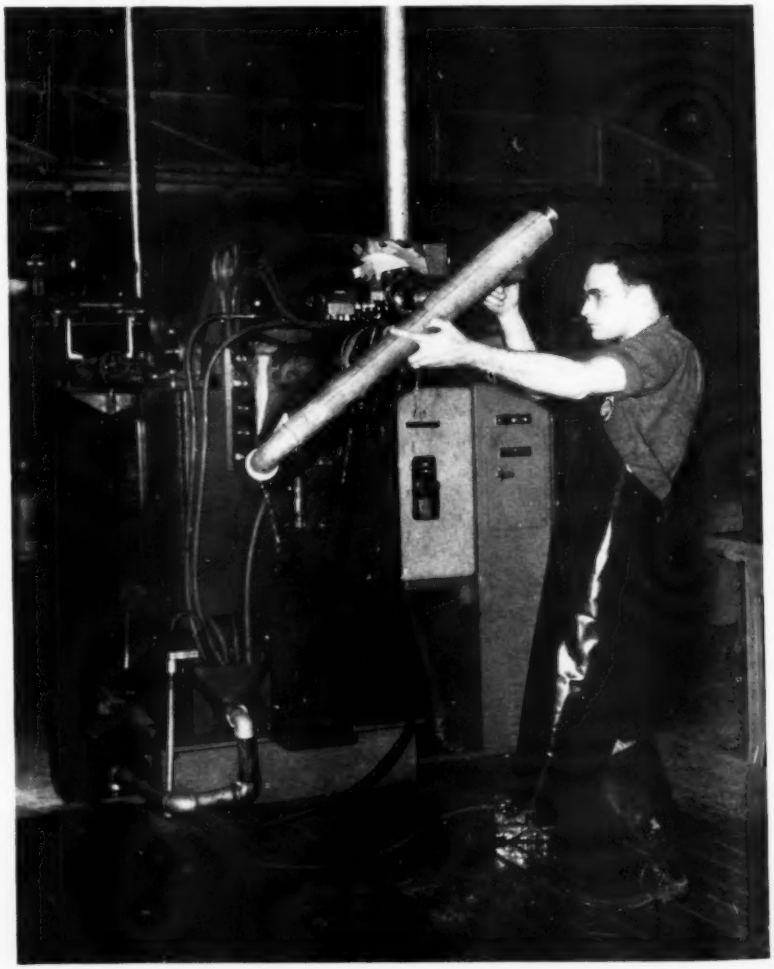
The dry-disc rectifier machines are new additions to the Ryan plant. They were purchased to supplement our single-phase equipment and will be utilized for welding stainless steels, nickel alloys and similar metals. This type of equipment has been successfully used by many other manufacturers for aluminum alloy work with excellent results, but we have installed it for production work with stainless steels only. Consequently, it does not incorporate those features normally required for aluminum welding. The outstanding characteristic of the new dry-disc machines is their simplicity of control, which will permit the minimum of maintenance. . .

This equipment will be used for the fabrication of jet, rocket, and piston engine components of high temperature-resistant steels, nickel alloys, and other special alloys. Such assemblies as combustion chambers, transition liners, exhaust cones, tailpipes, and manifolds will be welded on these facilities.

Single-phase, alternating current machines

Our single-phase equipment is the basic "work-horse" of the steel welding group and has been for many

Single-phase, alternating current seam welding machine used to seam weld flanges on stainless steel headers for aircraft engines.



years. These machines have performed well in the fabrication of stainless steels, nickel alloys, low carbon steels and titanium and will continue to prove valuable in this work. With the present trends toward heavier gauge materials and new designs, accessory equipment is being added to many of the machines, to widen their capacity. In a number of instances, newer machines of the three-phase type have taken over the jobs which required greater versatility.

The only accessories which we have used with this equipment have been those providing slope control post-heat and roll-spot facility. The basic reasons why the single-phase machines are classed as our primary steel welding tool are their reliability, availability, simplicity, and low cost. . .

We are aware of the inroads which the new three-phase machines are making into the steel fabrication work, and have a large number of these machines in our plant. With their higher power factor, balanced loading, and lower demand characteristics, they are replacing single-phase equipment in many categories. Their adaptability to different materials is also a strong factor in their popularity. However, this does not mean that the single-phase equipment has been rendered useless in the aircraft industry. We are making comprehensive use of the latter in the work for which it is suited or adaptable.

Portable units

We have utilized a number of interesting portable welding machines, of the single-phase type, which are used with designs where accessibility is a problem. Many of these are overhead, suspended models. It is not surprising to find portable equipment which meets or exceeds the military specifications on steel thicknesses which were considered ceilings on stationary facilities during the recent war. Credit for this achievement should go to the equipment manufacturers and commercial welding plants who have pioneered in this special development thus making available standard designs for utilization on aircraft joining problems.

Accessories

We belive that certain accessories are a must for use with resistance welding equipment in an aircraft factory. These include:

Slope control — As we use it, this accessory is an appreciable aid in welding tasks where extreme thick-to-thin ratios and minimum edge distances are prevalent and where reduced electrode pressures are mandatory. It is also valuable in handling materials which exhibit a tendency toward excessive "spitting".

Pre-and post-heat controls — These controls are almost mandatory when heat-treatable steels are welded. They may be used in the same manner as slope controls with reasonable success and may also be utilized for many different pulsation welding effects. Often, the addition of either slope or pre- and post-heat controls will permit a smaller welding machine to accomplish a job that would otherwise require a machine of greater capacity.

Deflection firing — This feature, found on many World War II machines, is a necessity, in our opinion, on equipment used to weld aluminum alloys. It consists of a resilient member, incorporating a dial indicator, micro-switch, and micrometer adjustment. Located between the electrode and pressure members of the machine, it is calibrated in pounds of electrode force. When properly set, it permits the current to flow only at the exact pressure desired and is much more accurate in this function than using gauges which indicate air pressure at a point distant from the actual work. A properly designed deflection firing system will cut welding current when pressure drops, prevent firing under light pressure, provide increased control with less maintenance over pressure system, and monitor the electrode pressure throughout the complete welding cycle.

Fixed-increment heat and timing adjustments — We favor the use of appropriately small fixed increment adjustments for heat and timing control because it gives us better opportunity to duplicate work with exactness. This is a matter of individual opinion and may not be important in plants where duplication work is not a factor.

Roll-spot devices — This accessory has been found to be useful in seam welds and spaced spot welds where accessibility permits its use. It steps up production rates and assures accurate spacings. Many new designs are being developed to utilize roller electrodes on spot welding and this accessory is a must for economical production on jobs permitting its use.

Reduced heat first spot — This device automatically reduces the heat of a first spot weld in a set-up and compensates for the "shunt effect". It eliminates splash and cracking in critical assemblies, and its cost is repaid in savings on rejections and reduced re-working.

Series-parallel tap switches — These devices save time in setting up major changeover jobs in large machines. A series-parallel transformer tap system is a necessity where fine heat control is desired and a wide range of work is to be accomplished.

Uni-polarity, plus or minus firing — This facility, available on some machines, is employed where analysis indicates that uniform penetrations in sheets of different thicknesses can be obtained by utilizing the "drift" due to direction of welding current. This "drift" has often been an important factor in obtaining proper heat balance.

Relatively few of the possibilities which modern resistance welding equipment and new techniques offer have been realized. If recent years are a guide to the future, design engineers, production experts, and research analysts will continue to uncover metal joining applications which this process can perform with greater speed and economy than any other.

Adapted for *finish* from a paper presented to the members of the American Institute of Electrical Engineers at their 1952 Electric Welding Conference, in Detroit, Michigan.

finish SUGGESTION BOX

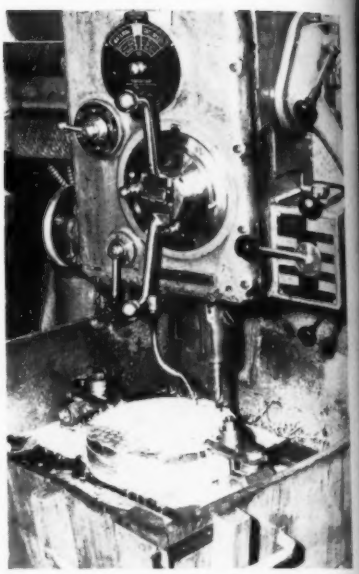
New technique protects templates during drilling

A new technique with pressure-sensitive masking tape — protecting templates during drilling — is saving thousands of dollars and man-hours annually for Ross Heater Division of Kewanee-Ross Corp., Buffalo, New York.

Considerable labor savings on drilling and template making, and dollar savings of $50 to $100 a day by eliminating long machine tie-ups, were reported. In addition, template life has been increased 300%.

To effect this saving, the firm — manufacturers of heat exchangers and condensers — is using 6-inch-wide strips of masking tape to protect the templates. It is applied solidly across the multi-holed top surface of each template, and rubbed with a colored crayon to outline the holes underneath.

While holes are bored in the steel plate below the template, the resulting chips and slivers collect on the taped surface, and are merely brushed away before the next hole is drilled.



Formerly, such chips and slivers would spray up and fall into the template's other, unprotected holes. To prevent "out-of-round" holes or other serious damage to the template, the steel particles had to be painstakingly removed with a magnet and pick before any further drilling could be accomplished. Elimination of such delays, it was pointed out, accounts for the firm's present savings.

Source for further information on this masking tape may be obtained by writing to *finish*.

Editor's mail → *from Page 8*

safe transit lab at Michigan State

We are particularly interested in the *safe transit* section of your magazine because we eventually plan to install and operate a Safe Transit laboratory here at our college for use in conjunction with our courses on the design of shipping containers. If it is possible, we should like to be placed on your mailing list.

James W. Goff, Instructor
Department of Forest Products
Michigan State College
East Lansing, Michigan

the Department of Forest Products will receive future issues

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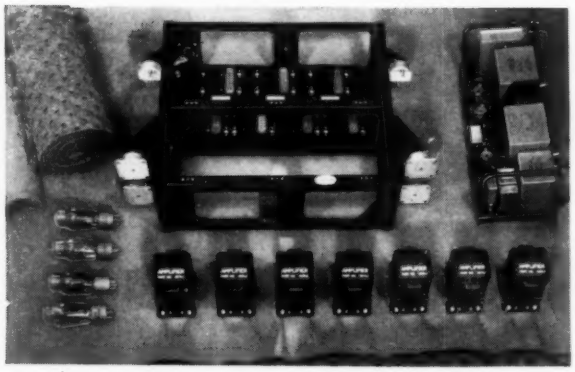
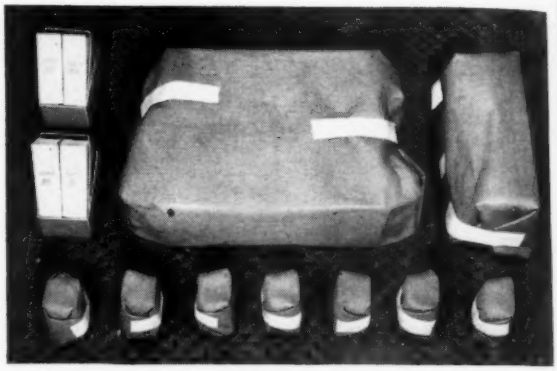
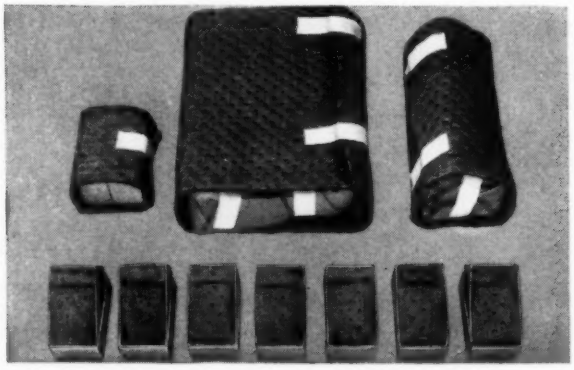
Custom Protection—prevents shipping damage to military products as no other packaging method known!



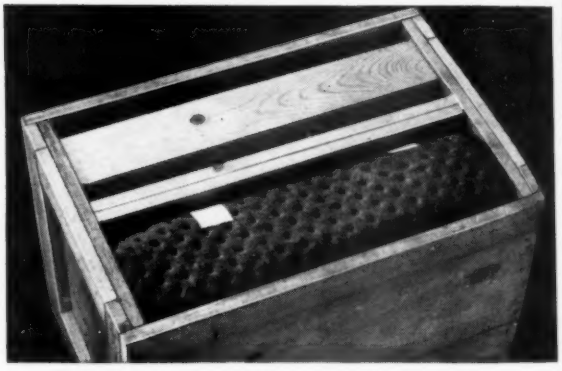
1. Assembly of parts of Amplifier Unit and all materials used in packaging.



2. Each part (except 4 boxed tubes) is wrapped in Grade A paper and tape sealed.



3. Each part is over-wrapped with Dimple Embossed KIMPAK, including 4 boxed tubes.



4. Completed assembly is inserted in wooden box for overseas or domestic shipping.

In the shipment of vital defense and military supplies, the use of sound packaging methods is a definite requirement. So to meet rigid government standards, many companies are again—as in World War II—turning to Kimberly-Clark Interior Packaging — KIMPAK.* This modern packaging material of unlimited versatility can be "tailored" to fit the needs of every type of product—is designed to protect against the most extreme shipping hazards.

KIMPAK is soft, strong, grit-free—easy to apply as wrapping paper. It cushions delicate electronic instruments against shock and vibration—protects finely finished surfaces against scratching and pressmarking. Certain specifications absorb up to 16 times their own weight in moisture; others resist liquids, or insulate against temperature changes. KIMPAK is feather-light, too, yet gives more protection than most materials of far greater weight and density.

Whatever your shipping problem, there is a specification of KIMPAK designed to do the job best. Start giving your military supplies *custom protection* with KIMPAK—it's the safe, modern way to prevent shipping damage. For our free booklet "Military Packaging," or further information, write Dept. K-11, Kimberly-Clark Corp., Neenah, Wis.

KIMPAK INTERIOR PACKAGING

A Product of **Kimberly-Clark**

*T. M. REG. U. S. & FOREIGN COUNTRIES

Photos courtesy Servomechanisms, Inc., Westbury, L. I., N. Y. Product shown — Co-ordinate Converter Amplifier Unit.

ST-2

safe transit

A monthly trade publication section devoted to improved packaging and shipping and materials handling practices in the home appliance and allied metal products field.

Plant experience information for all executives and plant men interested in the problem of packaging and shipping improvement and loss prevention.

Complete information on the National Safe Transit pre-shipment testing program for packaged finished products, and detailed progress reports of divisions and sub-committees of the National Safe Transit Committee.

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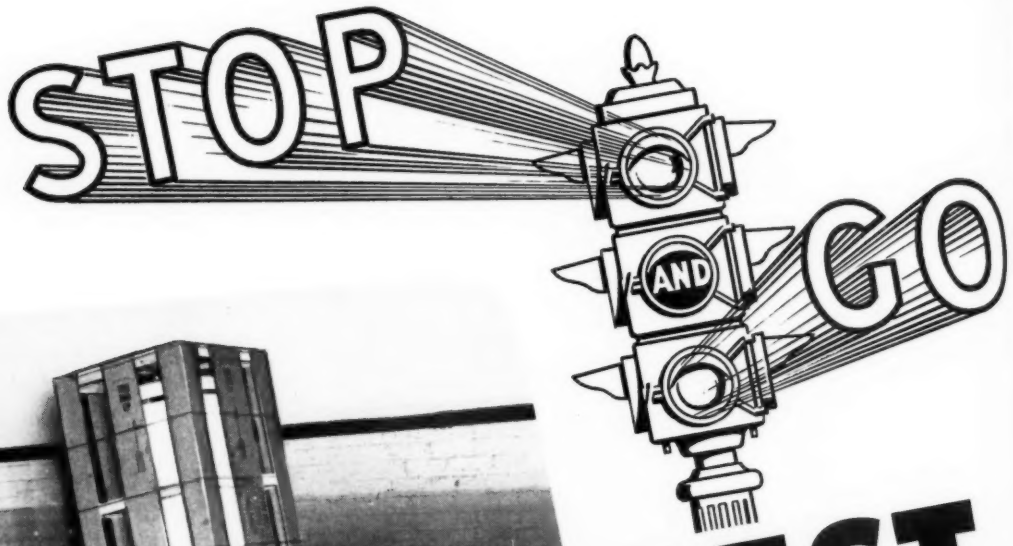
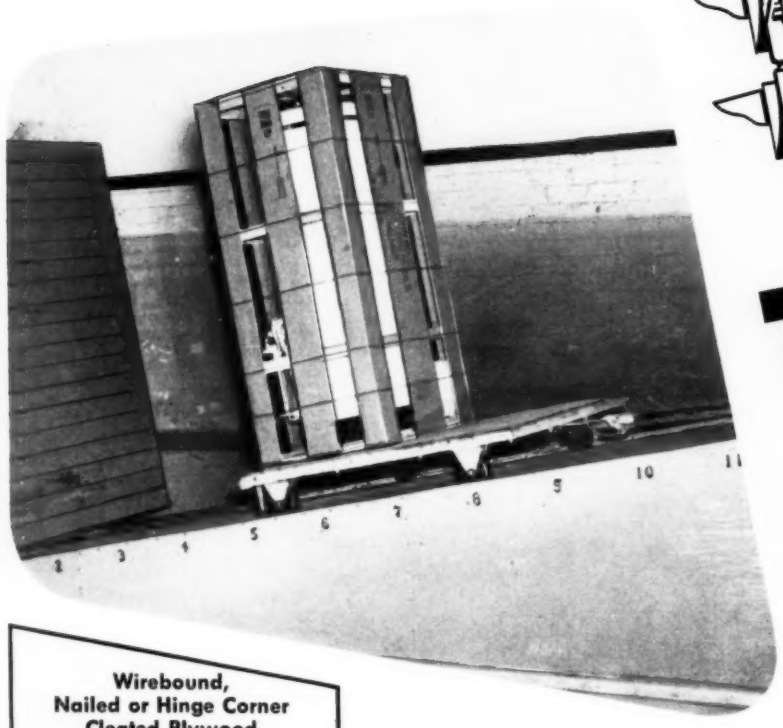
At SIPMHE Exposition — *Nancy Jason enjoyed a ride on a roller conveyor with Betty Cagney pushing. The conveyor was one of scores of materials handling methods, devices and equipment exhibited at 7th annual Industrial Packaging and Materials Handling Exposition at the Coliseum, in Chicago (see Page ST-9).*

Air Force packaging men — *visited the new design and testing laboratory of General Box Company, Des Plaines, Ill., recently while attending a three-day conference of the Air Force Packaging and Materials Handling Board in Chicago. The 13 officers who visited the General Box plant represented all eight of the Air Force service commands, and are responsible for material handling and packaging of supplies for Air Force personnel stationed throughout the world. Photo of the group was taken as they viewed the operation of a 14-foot revolving drum tester.*





TEST AT CHICAGO MILL'S LABORATORY

Wirebound,
Nailed or Hinge Corner
Cleated Plywood
Cleated Craveneer
Cleated Corrugated
Watkins Type Containers
Shop and Tote Boxes
Woodsteel Nesting Boxes

★

FOR DOMESTIC OR EXPORT
FOR PEACE OR DEFENSE

A shipping container for every shipping purpose

STOP those damage claims before they happen. Let our engineers give your shipping package the standard National Safe Transit tests. Failure to meet the Impact or other important laboratory tests will indicate the necessity of redesign. Let us prove shipability and give you the GO sign for your shipments.

Technical information, packing information, and testing services are available without obligation. Check with any Chicago Mill representative, or contact our Chicago office.

FOR SAFER TRANSIT BY • TRUCK • BOAT • TRAIN • PLANE

CHICAGO MILL AND LUMBER COMPANY

33 South Clark Street — **Chicago 3, Illinois**

Plants at: Helena, Arkansas • Greenville, Mississippi • Rockmart, Georgia
Tallulah, Louisiana • South Fork, Colorado • Chicago, Illinois

Hazards encountered by packages when shipped by railroads

by Sergei G. Guins • RESEARCH ENGINEER, THE CHESAPEAKE AND OHIO RAILWAY COMPANY, CLEVELAND, OHIO

CERTAIN hazards against which the products are packaged are common to all types of transportation. Stacking, loading, humidity, etc., are examples of these hazards. Some of the others, like impacts and vibration, which are encountered in all means of transportation, vary in their intensity and character depending on the vehicle in which it is transported. These hazards have another characteristic; that is, they can't be estimated emperically as they depend on the suspension of the vehicle, roadway, and type of service.

The Chesapeake and Ohio Railway Company, in an attempt to evaluate efficiency of various types of equipment sold, and to establish a program of improvement, has undertaken several test programs which lead to a fairly comprehensive picture of what is happening in a railroad box car, both on the road and in the yards. Our work on vibration study was conducted in cooperation with the Association of American Railroads and railway truck manufacturers, as well as the Signal Corps Department of the Army. Our own instrumentation consisted of an accelerometer, a 5000 cycle carrier system amplifier, and an oscillograph. The response of this combination shown in Figure 1 allowed us to measure with accuracy accelerations up to 60 cycles per second, with all frequencies over 200 cycles per second automatically filtered out, Figure 2 being an example of the record taken.

Vibration studies

Signal Corps engineers brought equipment that had a range of from 20 to 500 cycles per second. The overlap between the ranges of the two sets of equipment allowed us to make a cross check so that results could be easily compared. The high frequency data obtained, while of great value to electronics engineers of the Signal Corps, is of little importance to the majority of packaging engineers. Yet, it did explain the source of high accelerations that had been reported to exist in railroad cars. These high accelerations are coupled with frequencies of other 500 cycles per second, have movement amplitude of a few thousandths of an inch, and can be absorbed by a layer of corrugated board.

Editor's Note:

All *finish* readers are urged to note particularly Mr. Guins' reference, in the last paragraph of his article, to the necessity for cooperative effort between shipper and carrier.

The discussion regarding carloading practices will be of particular interest to those active in the National Safe Transit cooperative movement. One booklet, "Safe Transit . . . a *Must* for Home Appliances," has been available for some time showing recommended carloading practices for the major home appliances.

Since the inception of the NST pre-shipment testing plan for individual *packaged products*, the NST Technical Committee has been working on a similar standard pre-shipment test for complete carload shipments. It is expected that within a reasonable length of time a recommended Test Procedure may be released by the Committee for voluntary use by shippers. The Technical Committee reports that carriers have been very cooperative in connection with important "on the tracks" research work that has been and is being conducted.

The study of the oscillograph records gave us all the major frequencies and corresponding acceleration magnitudes, but to be doubly sure, harmonic analysis (Fig 3) of several records was made. The results of these studies is given in a graph form in Figure 4. The most interesting feature is that the frequencies present can be classified into two groups, one corresponding to the suspension frequencies and the other corresponding to frequencies of structural members, and that some frequencies are not present at all. It also indicates that vibrations caused by structural members are of fairly small magnitude and can mostly be ignored. Inasmuch as it is not practical to select a particular car with a particular suspension, a package has to be designed to either be outside of these frequencies or so that it can dampen the amplitude of the frequencies present.

75% of impacts in the yards — 25% on the road

Impacts are the other cause of damage to lading. Railroad cars are subject to impact both in the railroad yards due to switching, and on the road due to run-ins and pull-outs due to slack between cars, sudden brake application and train starts and stops. A survey made by Southern Pacific Railroad on all of its divisions indicates that about 75% of impacts take place in the yards and 25% on the road. A breakdown of impacts on a mile per hour basis (Figure 5) indicates that there are a number of impacts at speeds over 5 mph observed both on the road and in the yards. Impacts below 5 mph were disregarded as any impacts

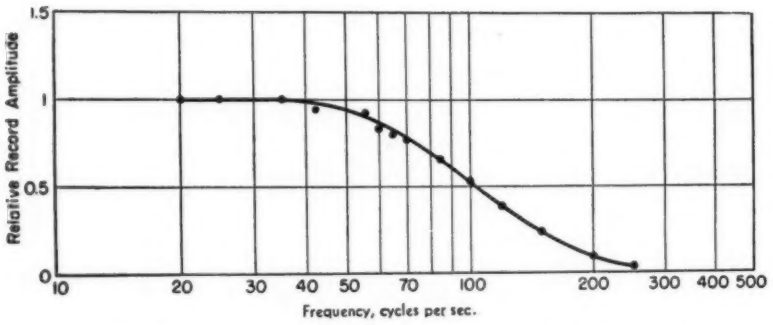


Fig. 1 — Calibration of 6g accelerometer with two galvanometers.

below this speed are considered to be safe, that is not causing any damage. It must also be pointed out that the speeds were based on the "Zones" of the impact register, but they check with some of the data collected by actual measurements in the yards around Chicago. The study of shocks that occur on trains of various lengths and in various locations in the train conducted on the Pere Marquette District of The Chesapeake and Ohio Railway Company indicates that the intensity of shocks depends mostly on condition of the draft gear of the car. If the draft gear functions properly, the intensity of the shocks is low, but if the draft gear is defective, they can be very large.

The work done by the research and development division of the Pullman-Standard Car Mfg. Company and by the North American Aviation Company with the cooperation of Southern Pacific Railroad gives a good idea of what happens to the cars when they are impacted during switching. Pullman work was done under laboratory conditions while tests on the Southern Pacific were made under operating conditions. Figure 6 gives an example of results obtained during these tests. One thing is quite evident—that the magnitude of impact even under worst conditions is much less than the intensity of shock produced by the drop test specified by most packaging design procedures or encountered during loading and handling operations.

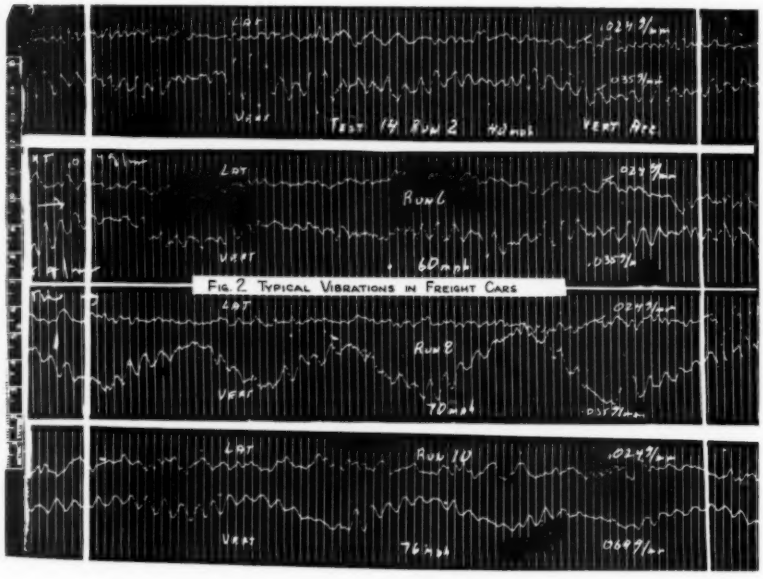
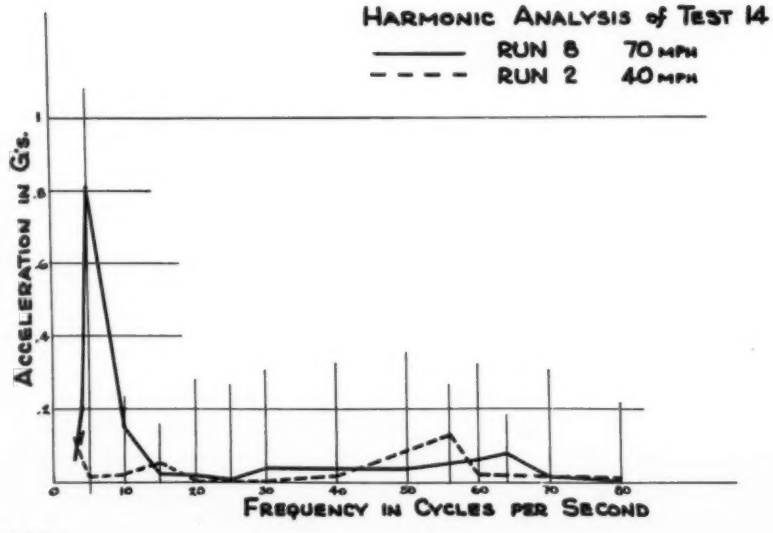


Fig. 2 Typical Vibrations in Freight Cars

Fig. 3



Possibilities for equipment improvement

The data presented above is not an attempt to exonerate the railroads (they still have a problem of delivering merchandise without damage), but to try and state the conditions as they exist and then try and outline a course that would lead us to a solution of the problem. The railroads now own and operate 1,721,269 freight cars with a replacement schedule including rebuilding and upgrading of about 10% a year. Any mechanical improvement would, therefore, be slow in becoming general and cannot be counted to give any immediate relief. There is a general movement toward elimination of stiff spring snubberless type trucks. On old equipment, this is done by introducing snubbers with the springs or using what is known as packages, a long travel spring nest with built-

in dampers. The effectiveness of these devices does not always do what we would like compared to modern trucks, but they tend to eliminate the shaded area of Figure 4 labeled a 1915 type all-coil truck. This in itself is a great improvement.

Effectiveness of draft gear is a problem under consideration and various designs of cushioned underframe will be brought forward. These will tend to reduce the intensity of shocks at a given speed, but their effect might be nullified by switching speeds that are increasing with the years in the effort to reduce idle time of cars and improve delivery time. The immediate answer is not then in the mechanical performance of the equipment as such, but in its use.

Note:

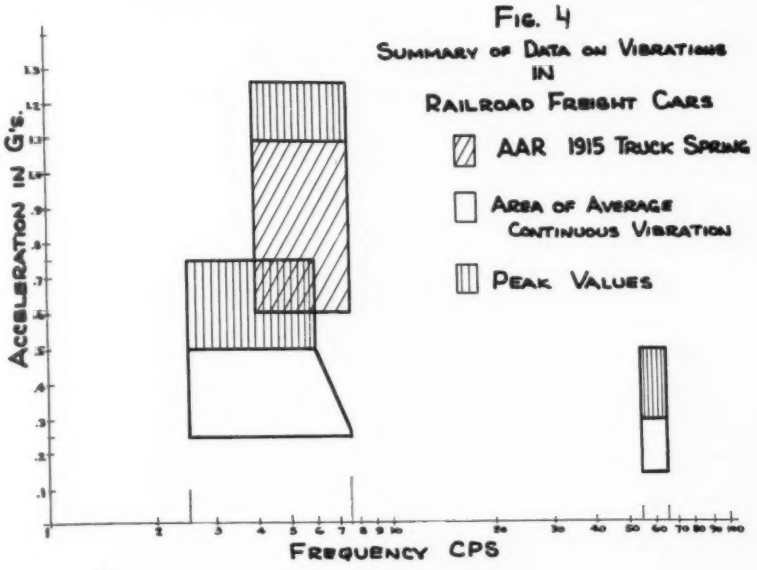
This article was prepared for delivery at the Packaging and Materials Handling Short Course jointly conducted by the Society of Industrial Packaging and Materials Handling Engineers and the College of Mechanical Engineering, University of Illinois, Extension Division, Chicago, October 13-16.

For additional editorial and photographic coverage of the meeting, turn to Page ST-9 in this section.

What happens in the freight car?

What does really happen in the freight car? We load the car with a series of packages, which, according to laboratory tests, can singly withstand vibration, impacts, and a certain amount of compressive force. The question is, can they withstand the hazards of transportation collectively. These packages, unless they are segregated in smaller groups, have to take the force produced by the mass of all the packages lined up along the car. For example, a package 12″ cube, weighing 20 pounds, loaded in a 50 ft. box car, at a switching speed of 7 mph, will have a maximum compressive load of 49 x 20 x 12.4 pounds, or 12,160 pounds. To design a package to withstand such load would be impractical. The answer then is to sub-divide the load so that the maximum compressive force does not exceed an eco-

FIG. 4
SUMMARY OF DATA ON VIBRATIONS IN RAILROAD FREIGHT CARS



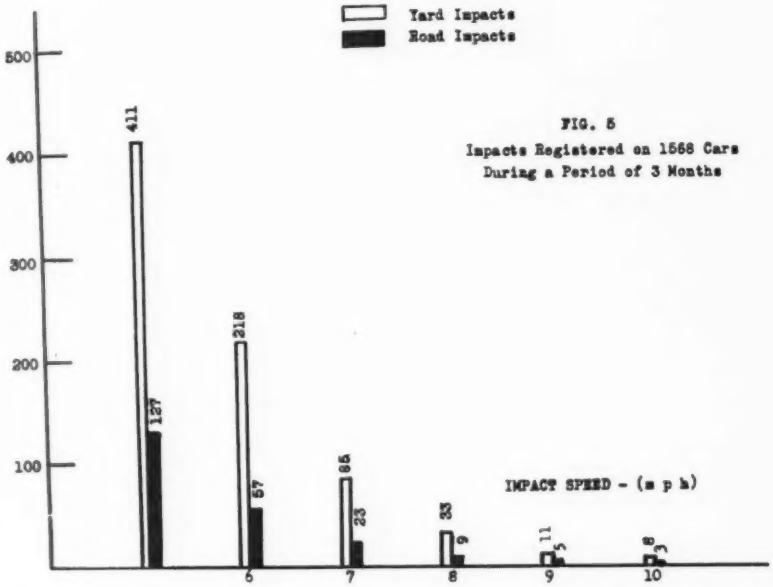


FIG. 5
Impacts Registered on 1568 Cars During a Period of 3 Months

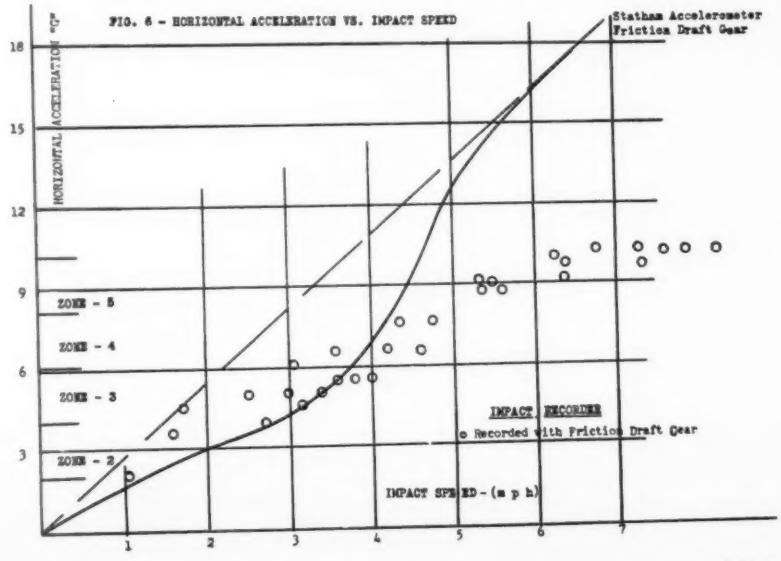
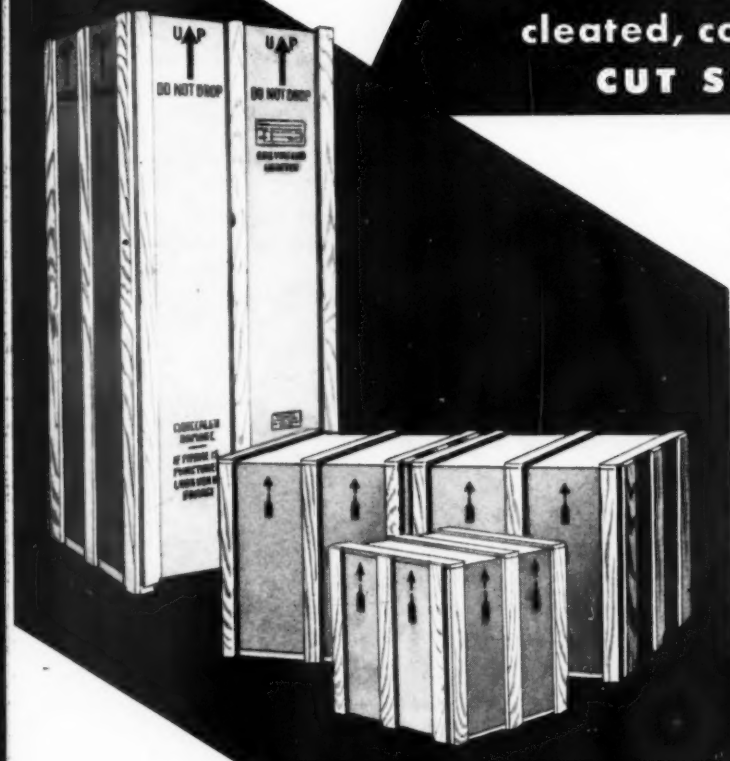


FIG. 6 - HORIZONTAL ACCELERATION VS. IMPACT SPEED
Statham Accelerometer Friction Draft Gear
HORIZONTAL ACCELERATION "G"
ZONE - 5
ZONE - 4
ZONE - 3
ZONE - 2
IMPACT RECORDER
o Recorded with Friction Draft Gear
IMPACT SPEED - (m p h)

WATKINS
cleated, corrugated containers
CUT SHIPPING COSTS



Watkins Containers are delivered to your factory 75% assembled, designed for quick and easy completion to save you labor, time, and expense. Special design emphasizes strength, yet keeps container weight at a minimum and reduces your cost of shipping.

In a Watkins Container your product is *completely* protected — enclosed 100% by a smooth, staple-free interior to safeguard fine finishes and to keep out dust and dirt.

The added "Traveling Billboard" feature provides space for your two-color advertising message on all four sides of the container.

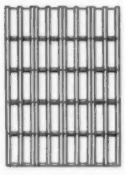
Scientifically designed, the Watkins Container is light weight without sacrifice of strength to carry your product safely, strength for stacking to any practical height, strength to resist weaving, shock, and distortion.

Ship your carefully manufactured products safely and economically — ship them in Watkins Containers.

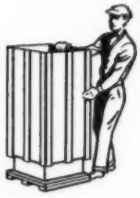
It will pay you to check with a Watkins producer.

re are some products that are being shipped in Watkins Containers:

Washing Machines	Space Heaters	Clothes Dryers	Sinks	
Ironers	Furnaces	Dishwashers	Air Compressors	
Hot Water Heaters	Pumps	Kitchen Cabinets	Surgical & Hospital Equipment	
Kitchen Ranges	Power Tools	Radios	Sanding Machines &	Stokers
Refrigerators	Fans	Water Softeners	Furniture	Oil Burners
Filing Cabinets	Soft Drink Coolers	Vending Machines	Television	Garden Tractors

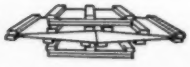


STACKING Vertical wood cleats provide EXCEPTIONAL SUPPORTING STRENGTH to carry heavy loads. Typical crate supports 4 tons.

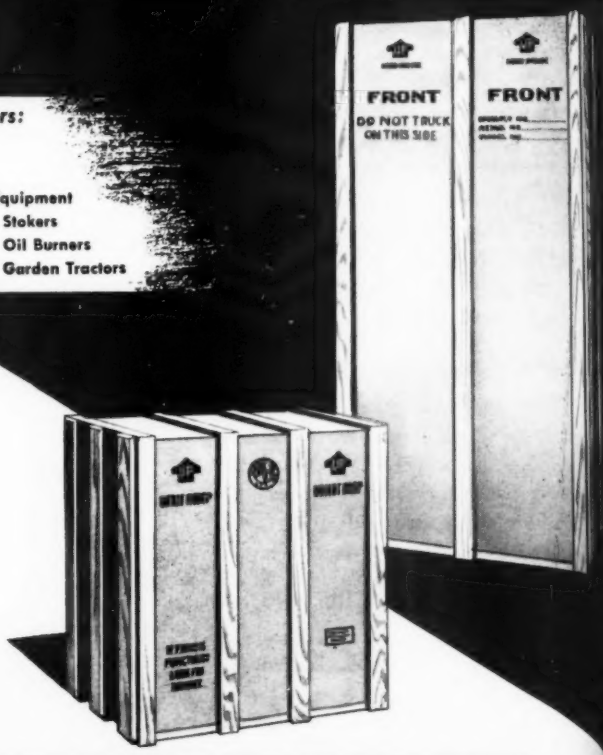


QUICK Assembly line packing is speeded up. EASY TO HANDLE. Complete protection for your product.

STRONG All wood cleats securely glued to tube-mat. Laboratory tests prove glued cleats RESIST WEAVE AND DISTORTION BETTER.



STORING Containers are delivered flat (only 3 sections) and closely nested to CONSERVE STORAGE SPACE.



THERE IS A
WATKINS CONTAINER
MADE NEAR YOU

These companies build WATKINS containers

CORNELL PAPERBOARD PRODUCTS CO.	1514 E. Thomas Ave., Milwaukee, Wis.
COZIER CONTAINER CORP.	446 East 131st Street, Cleveland, Ohio
CRATE-RITE MFG. CORP., Division of Pacific Ports Ind. Inc.	10901 Russet Street, Oakland, California
DURA-CRATES, INC.	940 East Michigan Street, Indianapolis, Indiana
GENERAL BOX CO., 1825 Miner St., Des Plaines, Illinois, and 16th and Maple Sts., Louisville, Kentucky	
HEMB & MARTIN MFG. CO.	Watseka, Illinois
ILLINOIS BOX & CRATE CO.	811 Center Street, Plainfield, Illinois
KIECKHEFER BOX & LUMBER CO.	1715 West Canal Street, Milwaukee, Wisconsin
LANE CONTAINER CORP.	10212 Denton Road, Dallas, Texas
LEWISBURG CONTAINER CO.	243 Singer Street, Lewisburg, Ohio
LOVE MFG., INC.	608 South Commerce Street, Wichita, Kansas

—an inquiry to any of these companies will get prompt attention—

The · WATKINS CONTAINER · Manufacturers

nomical value. Steps are being taken to do just that. We see the increased use of pallets, special containers, load dividers, and arrangement for use of steel straps. All of these indicate that this vexing problem of damage to lading is receiving very serious consideration and definite steps are being taken to reduce damage to a minimum on all types of lading.

What we particularly would like to stress is that the final solution cannot be brought about by either the shipper or the carrier, but must be solved by a cooperative effort, and that can be done only if there is a complete understanding of the problem.

REFERENCES:

1. "Study of Frequencies and Accelerations Present in Railroad Freight Cars," Chesapeake and Ohio Railway Co. Research Report No. 13.

2. "Investigation of End Shocks in Freight Service," Chesapeake and Ohio Railway Co. Research Report No. 19.

3. "Can Freight Cars be Protected against Higher Impact," Railway Age, August 25, 1952.

4. "Dynamics of a Standard Car During Impact," Research Report, Pullman Standard Car Mfg. Co.

5. Vibration Recording and Analysis Used in Association of American Railroads' Test Train, Clinton, Ill., 1950; Signal Corps Engineering Laboratories — Technical Memorandum No. M-1321.

Industrial packaging, materials handling show held in Chicago

including photos of three winners in SIPMHE protective packaging competition

THE greatest show in the history of the Society of Industrial Packaging and Materials Handling Engineers was held in October at the Coliseum, in Chicago.

Attendance of just under 8000 at the Exposition, a registration of over 800 at the technical Short Course on Industrial Packaging and Materials Handling and a list of over 100 entries in the seven classifications of the annual Protective Packaging and Materials Handling Competition exceeded those of any previous year.

Exhibitors interviewed on the floor of the Coliseum as closing time neared were unanimous in agreeing this year's crowds showed exceptional and unprecedented interest in the exhibits, especially in new developments.

Editor's Note:

Further editorial and photographic coverage of the 1952 Industrial Packaging and Materials Handling Exposition, the Short Course, and the Protective Packaging Competition will appear in the December issue of *finish*.

The technical Short Course, sponsored jointly by SIPMHE and the University of Illinois, started the record-making triple event off to a flying start with just under 300 registrants at the opening session Monday morning, October 13. From then until the close of the Short Course and the Exposition, Thursday afternoon, October 16, all sessions were exceptionally well attended.

Three winners in Protective Packaging Competition: Left — First Prize in Group 1 (corrugated or solid fibre boxes) and winner of Irving J. Stoller Award, Ralph Hawes, RCA; Center — First Prize in Group 7 (materials handling), Edward J. Runser, Jr., General Electric; Right — Winner of Harold Jackson Trophy, and Second Prize in Group 5 (general), William W. Arnold, Douglas Aircraft Co.

CUSTOM DESIGNED

HEAVY-DUTY SHIPPING CONTAINERS

International's heavy-duty corrugated fibre shipping containers are now being used for such products as stoves, water heaters, washing machines, refrigerators, furnaces. Each individual packaging problem is worked out by International's experienced designers.

Let's look at this new shipping case for gasoline pumps . . . here's what it does:

- **Delivers the pump to on-the-job workers without damage. Package can be opened and pump set in place in minimum time.**
- **Completely incloses the pump to preserve factory-brite cleanliness of the finish.**
- **Provides large, clean outer panels for displaying your product message and brand name.**

We would like to give you more information about this and other package designs. Write to any of the manufacturing plants or offices listed below—

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Los Angeles 54, California
5120 South Soto Street

Chicago 38, Illinois
5133 West 65th Street

Kansas City 3, Kansas
2101 Kansas Avenue

Springhill, Louisiana

Somerville 45, Massachusetts
Clyde & Warwick Streets

St. Louis 11, Missouri
7901 Michigan Avenue

Whippany, New Jersey

New York 17, New York
220 East 42nd Street

Cleveland 13, Ohio
1001 Terminal Tower

Wooster, Ohio
689 Palmer Street

Philadelphia, Penn.
1126 Lincoln-Liberty Bldg.

Georgetown, South Carolina

Attending policy committee meeting, left to right: Front row — John Oliver and Ralph Bisbee; Center row — F. A. Petersen, M. F. Weber, Frank Gibson, C. Naffziger, R. P. Carr, R. A. Dadisman, Dana Chase and L. A. Adams; Back row — P. W. Bush and W. B. Keefe.

Safe Transit policy committee plans accelerated program

new plans include educational color-sound movie, special editorial activity, and big national meeting for industry, carriers, and cooperating groups

AT a recent meeting of the Policy Group of the National Safe Transit Committee, the progress of this voluntary, cooperative movement for reducing packaging and shipping losses was reviewed, and plans were laid for accelerating the Committee's activities.

The meeting, held in the Auditorium of the Westinghouse Electric Corporation, Mansfield, Ohio, was attended by the following:

Ralph Bisbee, Westinghouse Electric Corp., General Chairman

John C. Oliver, Porcelain Enamel Institute, Chairman of the Secretarial Division

R. A. Dadisman, Armco Steel Corp., PEI President

R. P. Carr, Frigidaire Division, G.M.C., Chairman of the Carrier Coordinating Division

Dana Chase, Dana Chase Publications, Chairman of the Educational Division

L. A. Adams, Chicago Vitreous Enamel Product Co., Chairman of the Manufacturers' Coordinating Division

M. F. Weber, Southern Express Co., Chairman of the Loading Research Division

Guests and Committee representatives in attendance included:

P. W. Bush, Westinghouse Electric Corp., Vice Chairman of the Technical Planning Division and representing E. H. Shands, Geo. D. Roper Corp., Division Chairman;

F. A. Petersen, Hunter-Thomas Associates, member of the Technical Planning Division;

C. Naffziger and Frank Gibson, representing the Association of American Railroads;

W. B. Keefe, Westinghouse Electric Corp., representing the American Society for Testing Materials.

New NST color-sound movie

One of the outstanding contributions for "spreading the gospel," and accurately portraying the Safe Transit program, is a new color-sound movie which is soon to be released for distribution.

Complete information on the availability and distribution plan for this effective 30-minute sound-color movie will be released by the NST Washington Office when copies are available for distribution. *Finish* will keep its readers informed concerning this important contribution to the NST Plan. This carefully planned, colorful movie is expertly narrated to tell the NST story clearly and interestingly.

Another plank in the program is a big Special REVIEW Section to be published in the January issue of *finish* magazine. This Special SAFE TRANSIT REVIEW Section of *finish* will bring readers up to date on current activity relating to the program, will review the tests and test results for the uninitiated, and will include result statements from many of the important companies which are certified to use the Safe Transit label.

Additional plans call for accelerated activity by the various Sub-Committees, which it is expected will develop greatly increased interest among manufacturers, carriers and all cooperating groups.

112 companies certified*

Announcement was made of the certification of the 112th company under the NST pre-shipment testing plan. Secretary Oliver reported that Safe Transit labels are now being used at the rate of many millions per year, with practically all of the leading certified companies participating in the labeling program.

Many of these companies are reported to be publicizing the labeling campaign to dealers and distributors as proof of their sincere effort to deliver their finished products to sales outlets, damage-free.

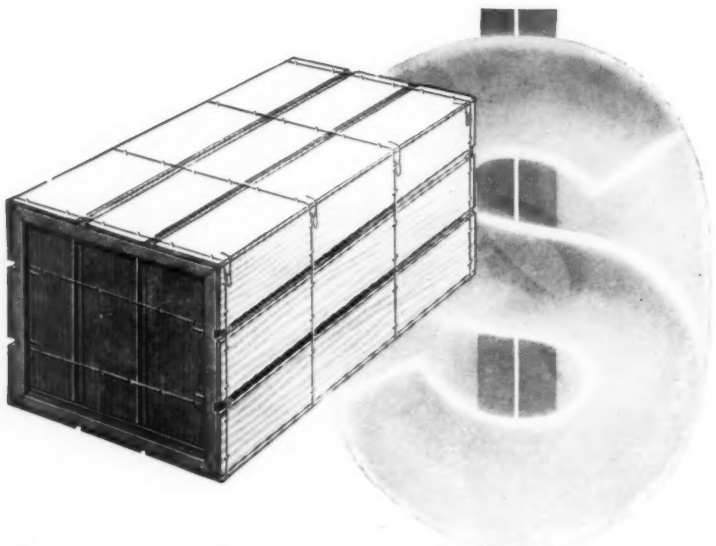
Reports from certified companies

*Now 113 certified companies

indicate increased interest on the part of distributors and dealers in the NST plan, and the Education Committee reported offers of cooperation by leading publications in the merchandising field to bring the cooperative plan to increasing numbers of their distributor-dealer readers.

Big meeting planned

The highlight of early 1953 will be a national meeting of the Coordinating and Industrial Divisions of the National Safe Transit Committee, through which all interested manufacturers in the home appliance, allied metal products, and radio and television fields will be invited to send representatives. All carrier and cooperating groups will also participate. Probable meeting locations will be Chicago, with date and details to be announced later.



Good Boxes Cost Less

SUPERSTRONG boxes and crates—designed and constructed for your product alone—have a lower overall cost than just ordinary containers.

First cost is by no means the last cost. SUPERSTRONGS save on shipping space, reduce weight, occupy less storage space, cut down on damage claims. Total saving in dollars over the course of a year is often considerable.

Contact us for full information on the complete SUPERSTRONG line of quality shipping containers.

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WIREBOUND BOXES and CRATES
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ST-12

FIRST RADIO-TV MFR. CERTIFIED BY NSTC

News comes to *finish* from the National Safe Transit Committee headquarters, in Washington, that Westinghouse Electric Corporation, Sunbury, Pennsylvania, manufacturer of radio and television receivers, has been certified under the National Safe Transit program of pre-shipment testing for packaged products.

It was only recently that the Policy Committee of NST decided to broaden the scope of the program which originally included appliances and allied metal products, to include radio and television receivers. Keen interest has been indicated in the program by a number of the larger producers of radio and television receivers and the Committee expects that within a very short time a number of these important companies will have been certified.

FIRESTONE, CONTAINER LAB. CERTIFIED BY NSTC

The National Safe Transit Committee has announced the certification of Firestone Steel Products, Akron, Ohio, and the laboratory of Container Corp. of America, Chicago.

E. E. AMES AND D. F. HAHN, OF GENERAL BOX, DIE

One top executive and a retired executive of General Box Company died recently. D. F. Hahn, 52, vice president and production manager, died September 23. Edward E. Ames, 71, retired chairman of the board, director, vice president and director of sales, died September 28.

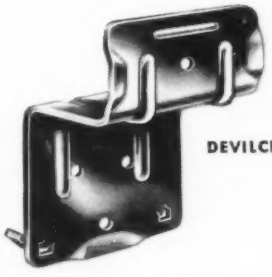
GAYLORD CONTAINER BUILDING NEW BOX PLANT

Edwin J. Spiegel, president, Gaylord Container Corp., has announced the acquisition of a tract in excess of 10 acres in north St. Louis, Mo., for the immediate erection of a corrugated and solid fibre box plant.

It was pointed out that Gaylord's present plant facilities in St. Louis have become inadequate. Plans call for one of the most modern and efficient box plants in the country, as well as one of the largest.

DEVILCLAW NO. 32

DEVILCLAW NO. 34



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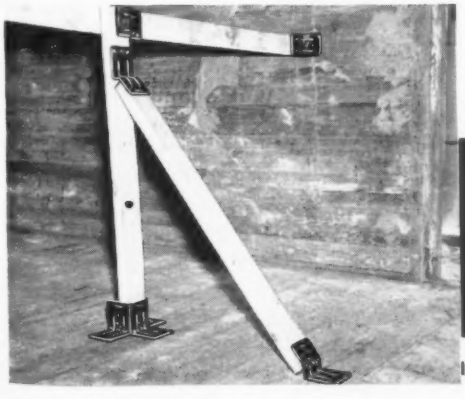
DEVILCLAW NO. 33



For CAR LOADING ECONOMY USE DEVILCLAW BLOCKING ANGLES

Devilclaw Blocking Angles win the approval of Shipper...Carrier...Receiver for they provide *added* protection to shipments when subjected to severe impacts during transit—and at a saving in both labor and materials.

Made of heavy gauge steel, Devilclaw Blocking Angles are available in a wide variety of patterns—all designed for easy installation and removal. There are designs for all types of pallets, crates and boxes of any size or weight—even for flat car loading of wheeled vehicles.

To save money, speed up loading and prevent in-transit damage, load the Devilclaw way.

A letterhead request, referring to this advertisement, will bring Free Samples for testing at your own plant and data on dollar savings.

CAR BLOCKING, INC. MANUFACTURERS • DISTRIBUTORS

BLOCKING DEVILCLAW ANGLES

1952 KIENLEN AVE. • ST. LOUIS 20, MO. • MUlberry 5900

ILLUSTRATIONS SHOW **DEVILCLAW ANGLES** IN VARIOUS POSITIONS

SAFE TRANSIT NEWS

NATIONAL SAFE TRANSIT COMMITTEE

DuPont Circle Building, 1346 Conn. Ave., N.W., Washington 6, D.C.

Four New Companies Join Safe Transit Program - Continuing on the increase, the NST Program has added four new companies to its rolls. They are:

Geneva Modern Kitchens, Inc., Geneva, Illinois
Victor Products Corporation, Hagerstown, Maryland
Firestone Steel Products, Akron, Ohio
Westinghouse Electric Corporation, Sunbury, Penna.

- - - - -

Westinghouse First Radio-Television Manufacturer Certified - The certification of the Westinghouse Electric Corporation into the National Safe Transit Program marked the first radio-television manufacturer to become a member of the NST family. The Sunbury Division of Westinghouse will be using Westinghouse Mansfield's testing facilities at the outset. The extension of the NST Program to include Radio-Television manufacturers had the endorsement of the Committee and carrier groups. The entire membership of NST now joins in a hearty welcome to the Sunbury Division of Westinghouse.

- - - - -

New NST Laboratory - Container Corporation of America, located at 900 North Ogden Avenue, Chicago, Illinois, has been certified as the 20th Safe Transit Laboratory.

- - - - -

Petersen Named Division Chairman - F. A. Petersen of Hunter-Thomas Associates has been named as Chairman of the Committee's Laboratory Coordinating Division. One of the functions of this Division is to see that the comments or suggestions of certified laboratories are placed before the Policy Committee, and to make possible an interchange of those ideas that will advance the Program.

- - - - -

Policy Group Meeting Held - Mansfield, Ohio, was the scene of a Policy Group Meeting held on September 19. Primarily under discussion was the scheduling and program for a General Meeting of the National Safe Transit Program. March of 1953 was the date decided upon, and Chicago was the chosen location. The agenda is being designed especially for the benefit of the Program's present participants, but it is felt that it will be equally valuable to those who have not yet embarked upon the pre-shipment testing Program.

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Carrier Group To Meet - R. P. Carr of Frigidaire, new Chairman of the NST Carrier Division, will meet in the near future with carrier representatives to discuss plans that have been outlined for furthering an exchange of information between carrier groups and manufacturers.

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AAR Pledges Continued Support - C. A. Naffziger, new Director of the Freight Loss and Damage Section of the Association of American Railroads, commenting upon the work of the NST Committee, commended the Program and pledged AAR's cooperation in reaching the mutual objective of damage loss reduction.

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New NST Color Film - The new NST film, showing the test procedures in full and explaining the test shipments that led to their adoption, will be ready for distribution very shortly. Advance showings of the full-color and 30-minute sound film have resulted in enthusiastic acceptance. The film to be distributed through the NST Washington office, is already in demand by traffic groups, carrier organizations, and manufacturers alike.

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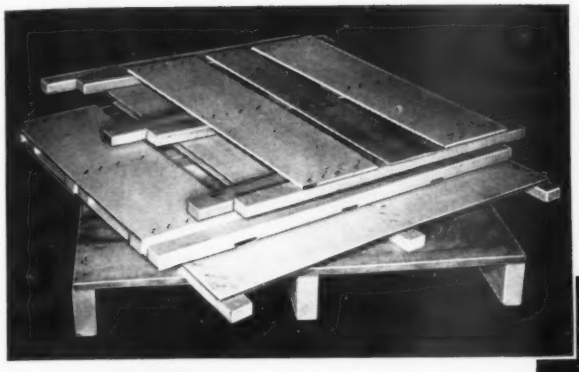

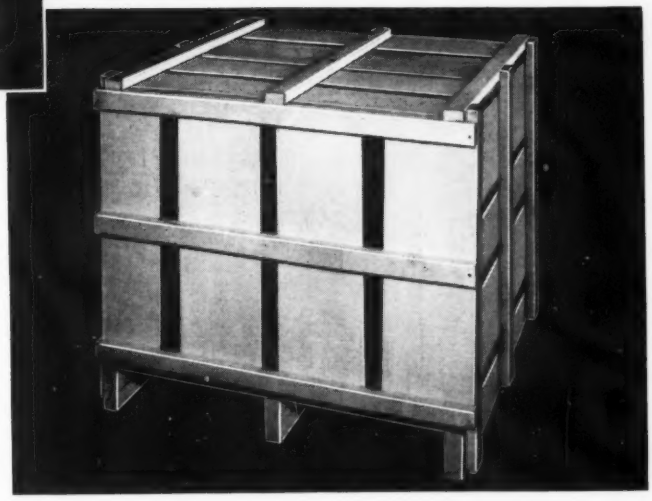

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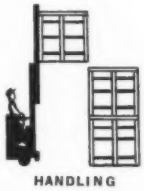

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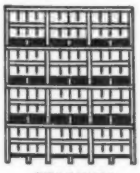

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Donald W. Dailey, who joined Servel, Inc., two years ago as product manager, has been elected a vice president. One of the nation's foremost designers, he was responsible for the development of Servel's portable electric Wonderbar, a refrigerette styled like smart furniture for use in any room in the home.

ASTE PLANNING NATIONAL TOOL ENGR. RESEARCH FOUNDATION

Plans for establishment of a national Tool Engineering Research Foundation to carry out scientific research projects in the field of manufacturing, manufacturing processes, and allied tool engineering subjects has been announced by the American Society of Tool Engineers.

ACME STEEL UPS ANDERSON

John G. Bucuss, president, Acme Steel Products Division, Chicago, has announced the appointment of Neil L. Anderson as manager of the Steelstrap department.